

**WELCOME TO TECHNICAL ORDER 00-105E-9.**

**THIS IS SEGMENT 7 COVERING CHAPTERS 8 AND 9.**



**IF YOU WOULD LIKE TO GO DIRECTLY TO THE TECHNICAL ORDER, CLICK ON THE CONTINUE BUTTON.**

**TO SEE THE SEGMENT INFORMATION CHANGE NOTICE, CLICK ON THE NOTICE BUTTON.**

**CONTINUE**

**NOTICE**



**CONTACT**

**IF YOU NEED TO CONTACT THE TECHNICAL CONTENT MANAGER FOR THIS TECHNICAL ORDER, CLICK ON THE CONTACT BUTTON.**

## TECHNICAL ORDER 00-105E-9 TECHNICAL CONTENT MANAGER

### WRITTEN CORRESPONDENCE:

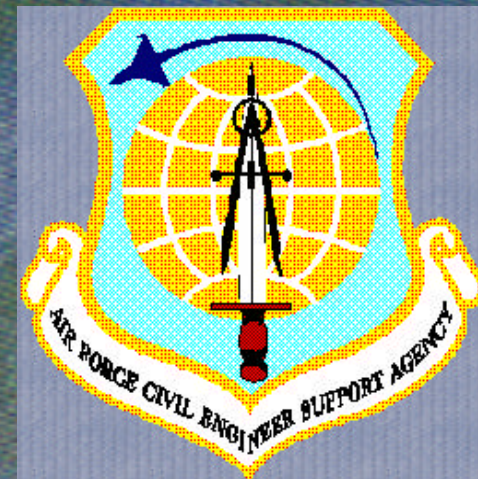
HQ AFCESA/CEXF  
ATTN: Fire Protection Egress Manager  
139 Barnes Drive Suite 1  
Tyndall AFB, Florida 32403-5319

E-MAIL: Tom.Stemphoski@tyndall.af.mil

INTERNET: HQ AFCESA Fire Protection PUBLIC WEB PAGE:  
<http://www.afcesa.af.mil/Directorate/CEX/Fire/default.html>

PHONE: (850) 283-6150  
DSN 523-6150

FAX: (850) 283-6390  
DSN 523-6390



For technical order improvements, correcting procedures, and other inquiries, please use the above media most convenient.

## SEGMENT 7 INFORMATION CHANGE NOTICE

This page is provided to notify the user of any informational changes made to Technical Order 00-105E-9 in this Segment and the current Revision. Informational changes will be referenced in the Adobe Reader's Bookmark tool as a designator symbol illustrated as a <[C]> for quick reference to the right of the affected aircraft. The user shall insure the most current information contained in this TO is used for his operation. Retaining out of date rescue information can negatively affect the user's operability and outcome of emergencies. If the user prints out pages his unit requires, the user shall print the affected page(s), remove and destroy the existing page(s), and insert the newly printed page(s) in the binder provided for that purpose. A Master of this TO shall be retained in the unit's library for reference, future printing requirements and inspections.

<u>CHAPTER</u>	<u>AIRCRAFT</u>	<u>PAGE</u>	<u>EXPLANATION OF CHANGE</u>
8	F-15	3,4,9,10,11	Hazards, engine shutdown (MFSOV- previously published as SS-5).
8	F-16	ALL	Added new information 1-12, SS-6, and safety belt configurations.
8	F/A-22	ALL	Changed designation from F-22 to F/A-22. Added paint scheme, fire pierce points, composites, weapons, hazards, fuel, emergency entry, MFSOV, and leg restraints information.

## NOTE

Chapter 8 contains emergency rescue and mishap response information for the following aircraft:

USAF	QF-4
USAF	F-5E/F
USAF	F-15
USAF	F-16
USAF	F-22A
USAF	QF-106
USAF	F-117A



## CHAPTER 8

### U.S. AIR FORCE

#### FIGHTER

### AEROSPACE EMERGENCY RESCUE AND MISHAP RESPONSE INFORMATION

#### 8-1. INTRODUCTION AND USE.

8-2. This section contains emergency rescue and mishap response information illustrations in alpha-numerical order relative to type and model of aircraft. This arrangement of illustrations is maintained from Chapter 4 throughout the remainder of the publication.

#### 8-3. GENERAL ARRANGEMENT.

8-4. Aircraft type designation has been positioned in the upper right corner of the horizontal illustration for rapid identification. Additional aids to rapid orientation are:

a. Recent technological advances in aviation have caused concern for the modern firefighter. Aircraft hazards, cabin configurations, airframe materials, and any other information that would be helpful in fighting fires, the locating and rescue of personnel will be added as the information becomes available.

b. Suggested special tools/equipment are listed in the upper left corner, on the Aircraft/Entry page of each listed aircraft.

c. Procedural steps covering emergency/normal entrances, cut-ins, engine/APU shutdown, safetying ejection/escape systems, and aircrew extraction are outlined on the left side of each page with coordinated illustrations on the right.

d. Illustrations located on right side of pages are coordinated with text by numerals and small letters depicting both paragraph and subparagraph on the page.

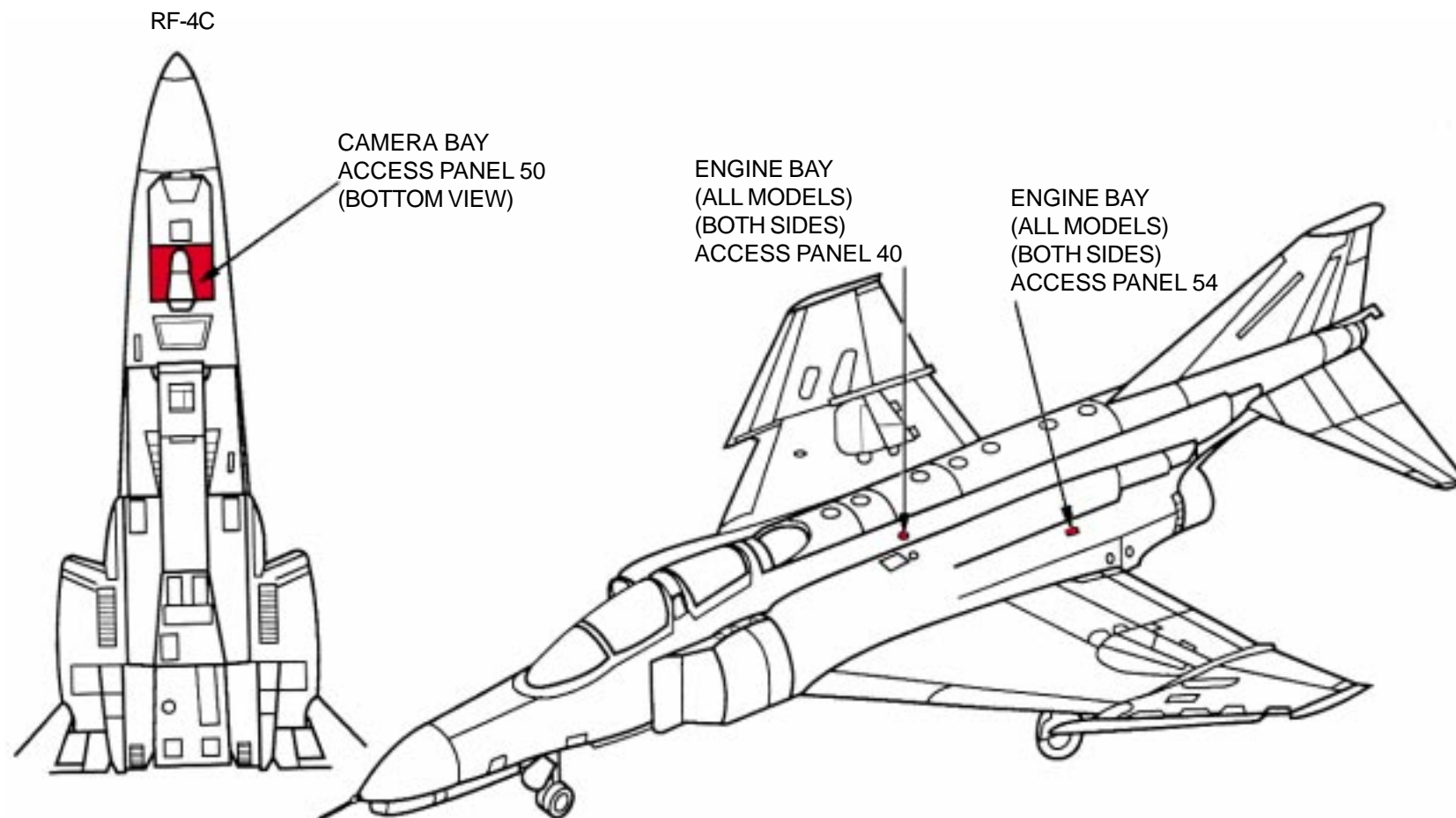
e. Each illustration is consistently colored and/or pattern keyed to highlight essential emergency rescue information.

f. Details are pulled directly from the illustration to highlight an area, thus eliminating unnecessary searching for desired information.

# AIRCRAFT SKIN PENETRATION POINTS

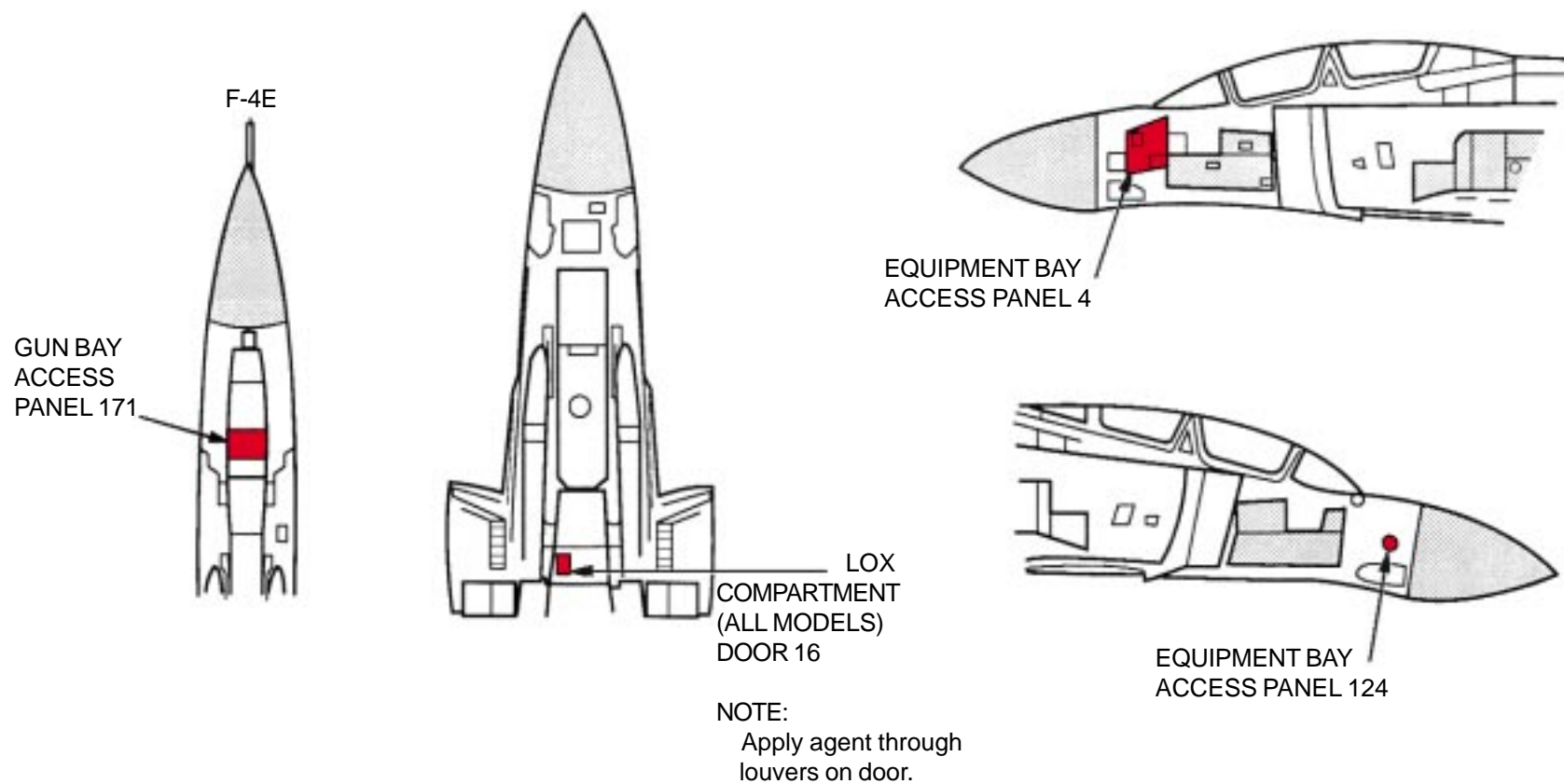
## NOTE:

The QF-4 is an unmanned/radio controlled version of the F-4 aircraft. It can also be flown by an aircrew when required. This aircraft carries a self destruct explosive mechanism for a radio controlled destruction if the aircraft becomes uncontrollable in the air or on the ground. Fire fighters are to only standby and keep personnel out of the self destruct and fire/explosive area.



## AIRCRAFT SKIN PENETRATION POINTS-Continued

QF-4



## SPECIAL TOOLS/EQUIPMENT

Power Rescue Saw  
Fire Drill II  
Rescue Ladders (2)

CONVENTIONAL AND NUCLEAR  
ARMAMENT UP TO 2,000 POUNDS

## NOTE:

Armament on F-4C,  
D, and E models.

PHOTOFLASH  
CARTRIDGES  
(RF-4 ONLY)

QF-4

## AIRCRAFT ENTRY - ALL MODELS

**WARNING**

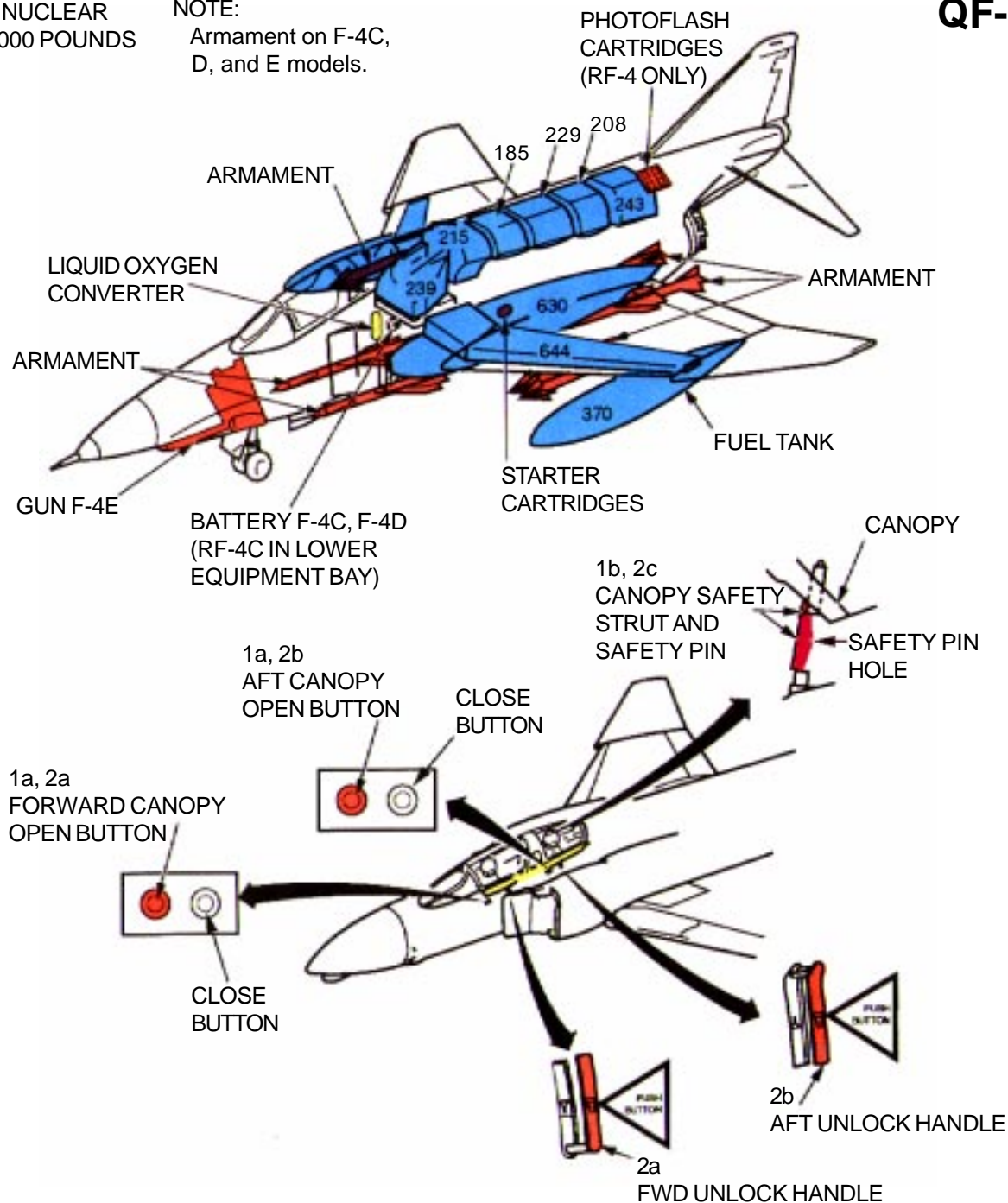
When bird strike damage to cockpit areas has occurred, check for foreign object damage to seat mounted initiator linkage. Opening canopy with items lodged between canopy actuator and seat firing mechanism may cause seat ejection resulting in death or serious injury.

## 1. NORMAL ENTRY

- Push canopy open buttons, located left side of fuselage, to unlock both canopies. Canopies will raise pneumatically.
- Install canopy hold open safety struts on canopy actuator pistons and install safety pins through pin holes on aft of strut to secure strut to the canopy actuator.

## 2. MANUAL ENTRY

- Push forward canopy open button and handle release button on manual release handle, located left side of fuselage, and turn handle counterclockwise to open position.
- Push aft canopy open button and handle release button on manual release handle, located left side of fuselage, and turn handle clockwise to open canopy.
- Lift and hold canopies open manually and install safety struts on canopy actuator pistons and install safety pins.





# AIRCRAFT ENTRY-Continued

## 3. EMERGENCY ENTRY

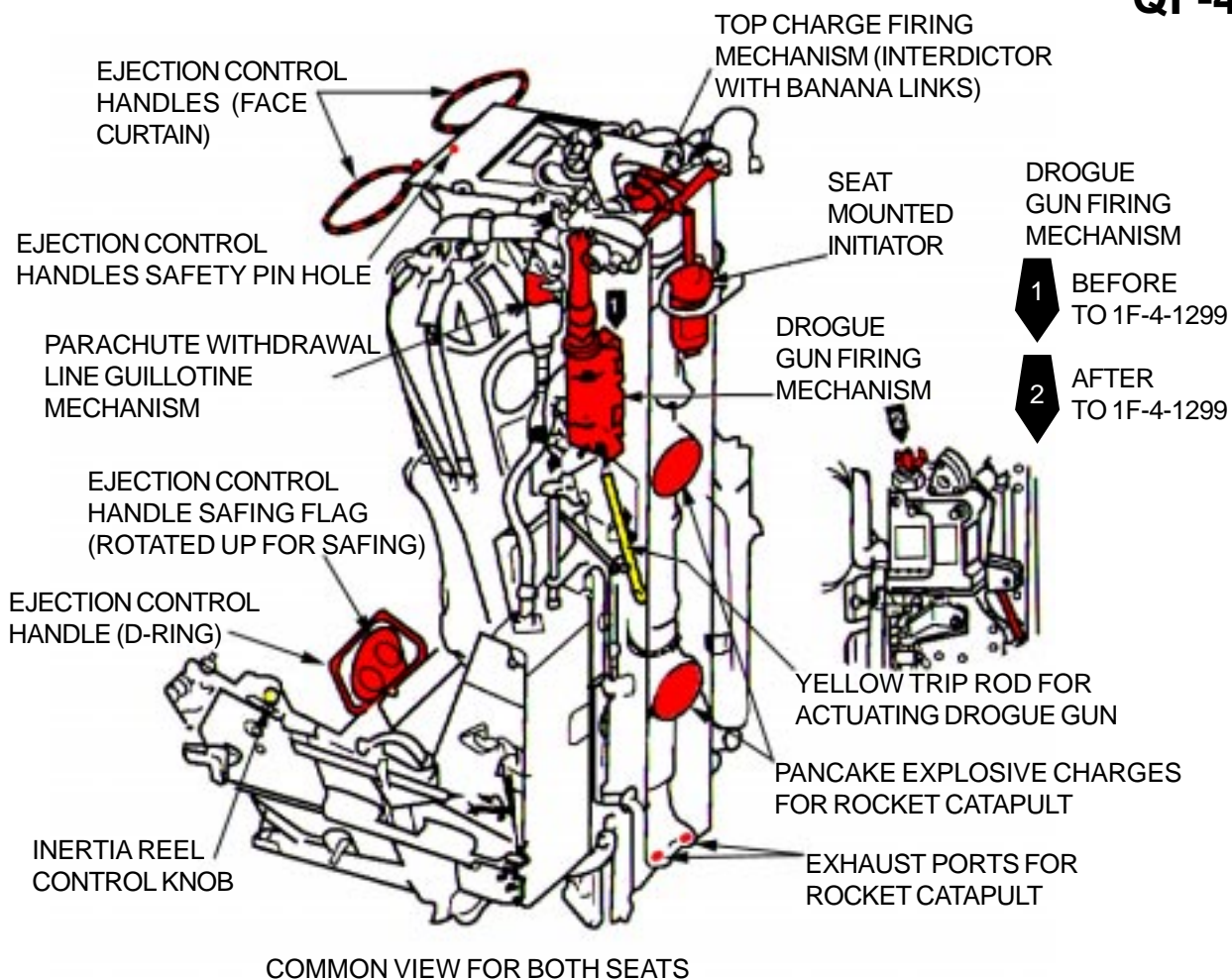
### WARNING

Do not attempt to jettison canopies with left engine running or aft canopy open. If left engine is running, access must be gained over left wing to the cockpits, avoiding intake and exhaust areas. Ensure that no F.O.D. exists around top charge firing mechanism and its yellow trip rod. Open canopies normally or manually then retard throttles to idle position. If engines are not running and aft canopy is not open then use steps 3a and 3b.

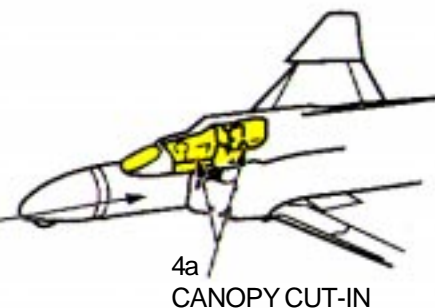
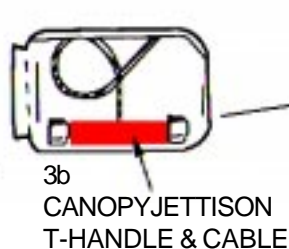
- a. Press button to open access door, located on left side of fuselage forward of left intake, and remove T-handle.
- b. Pull T-handle to full cable length by walking towards nose of aircraft, then sharply pull T-handle to jettison canopies. Canopies will be jettisoned up and aft of aircraft.

## 4. CUT-IN

- a. Cut canopy along canopy frame on all four sides for each canopy with power rescue saw.



3a  
CANOPY  
JETTISON  
ACCESS  
DOOR



QF-4

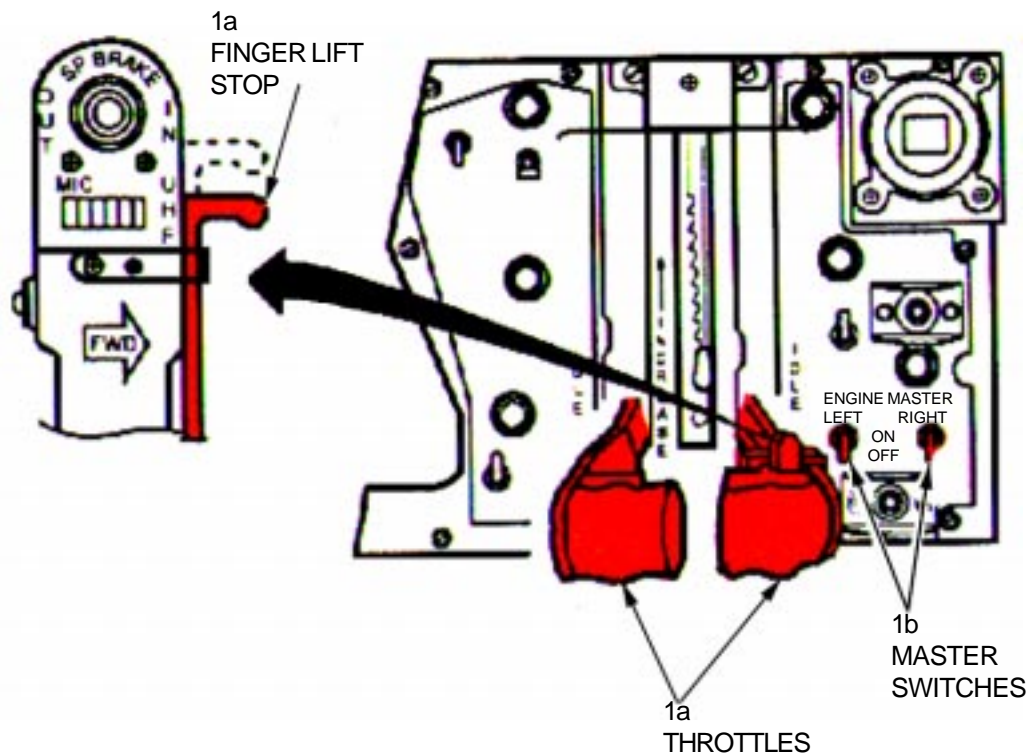
# ENGINE SHUTDOWN

## 1. ENGINE SHUTDOWN

### NOTE:

Engines can ONLY be shutdown from front cockpit. If throttles are jammed, engine can be shutdown by placing master switches to the OFF position.

- a. Raise finger lift stop and move throttles, located on left console, aft to OFF position.
- b. Lift master switches, located on left console, up and move aft to OFF position.



# SAFETYING EJECTION SYSTEM AND AIRCREW EXTRACTION

## 1. EJECTION SEAT SAFETYING

### WARNING

If canopies have been jettisoned or interdictor safety pin assembly is not installed in the catapult's top charge firing mechanism sear, a safety pin must be installed through the firing mechanism sear.

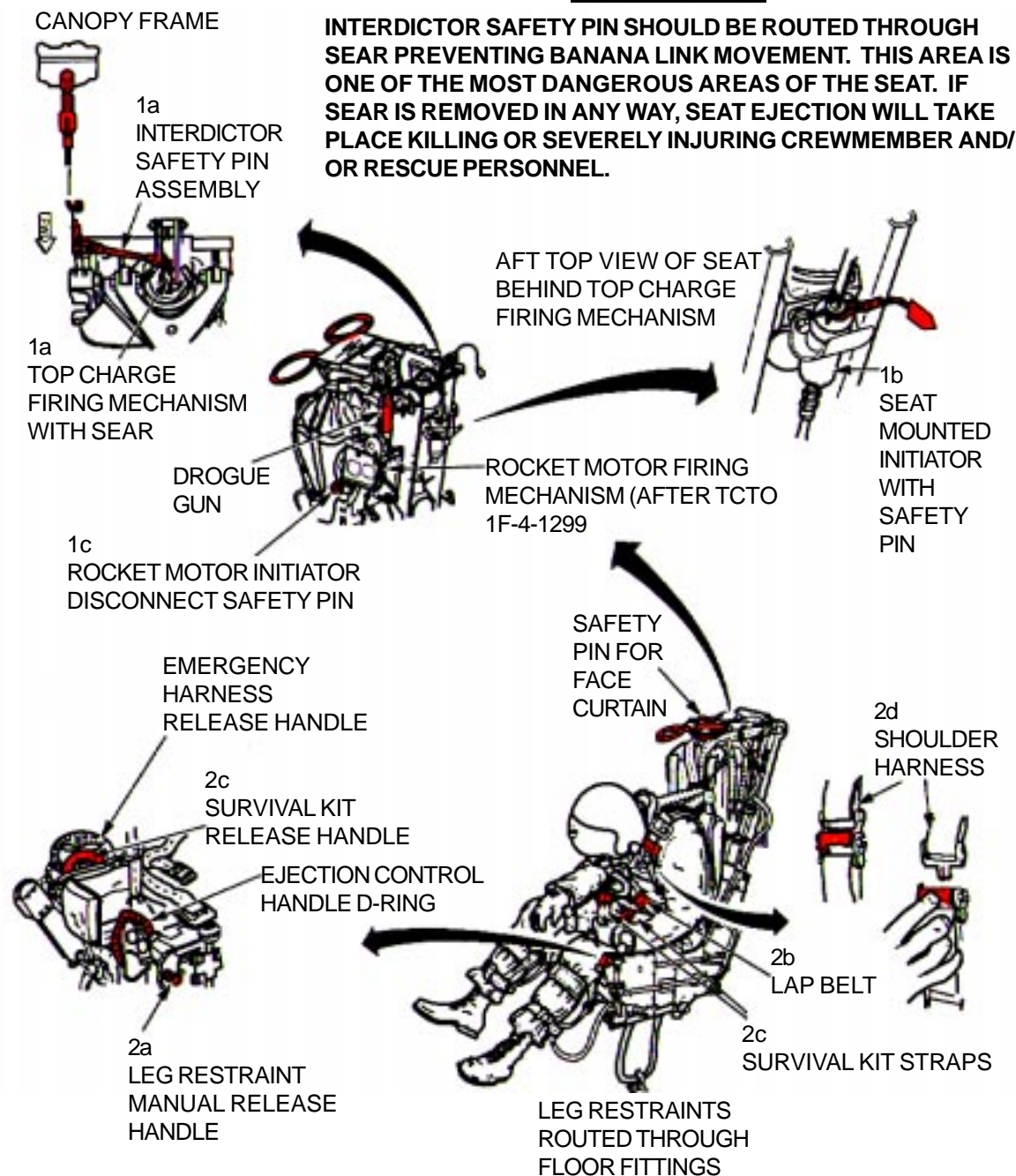
- Ensure interdictor safety pin assembly is installed through both ejection seats' catapult top charge firing mechanism sear.
- Install safety pin in the seat mounted initiator, located behind top of seat and catapult.
- Disconnect Rocket Motor initiator hose by pulling out initiator hose safety pin.

## 2. AIRCREW EXTRACTION

- Raise leg restraint manual release handle, located on left forward side of seat bucket.
- Release lap belt by pulling up on release lever.
- Pull yellow survival kit handle, located next to crewmember(s) right leg, up and aft until it separates from kit, or release left and right survival kit buckles.
- Release left and right shoulder harness straps.

### WARNING

To prevent possible injury to crewmember(s) use emergency harness release handle as last resort. When used, parachute restraints are released and will push crewmember forward.



# AIRCRAFT SKIN PENETRATION POINTS, DIMENSIONS, AND HAZARD AREAS

## DIMENSIONS:

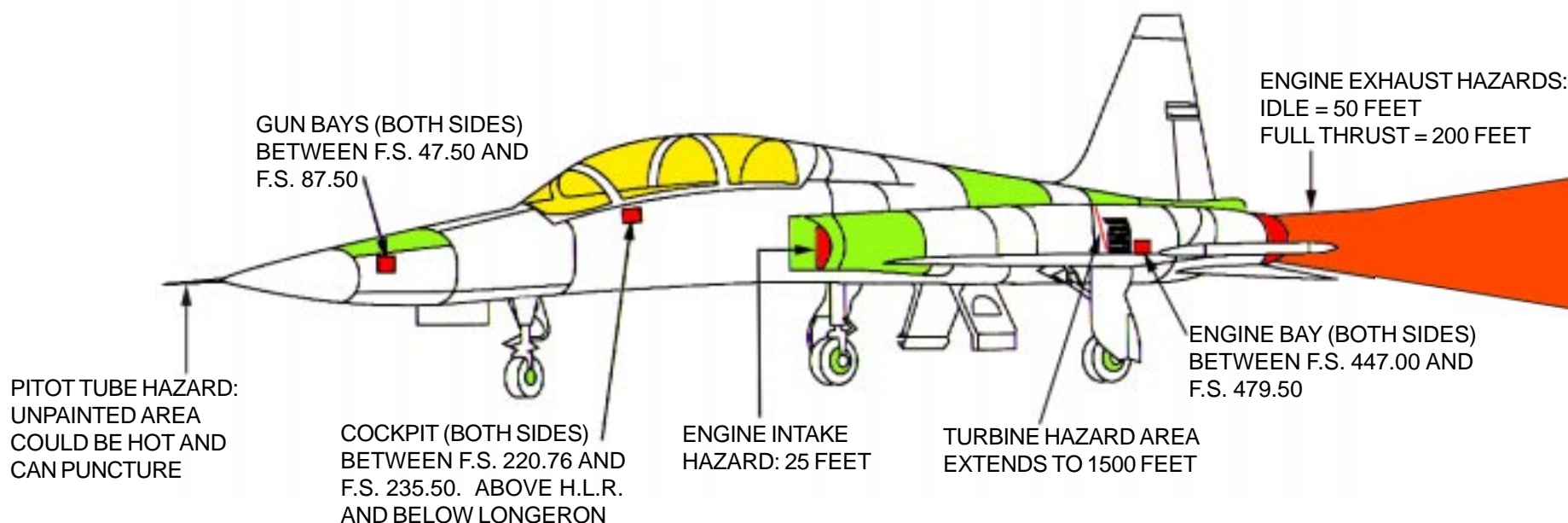
WING SPAN 25 FEET  
HEIGHT 12.9 FEET  
LENGTH 46.3 FEET

### WARNING

Magnezium fires should be fought with dry chemical and not water. Water usage will spread fire.

- PLEXIGLASS  
- WINDSHIELD AND CANOPIES
- MAGNEZIUM  
- WHEELS  
- AFT OF NOSE CONE  
- COCKPIT  
- INTAKE COVERINGS  
- CENTER OF FUSLAGE  
- FORWARD ENGINE AREA  
- AREA AROUND VERTICAL STABILIZER

F-5





## SPECIAL TOOLS/EQUIPMENT

Disarming Tool  
Power Rescue Saw  
Fire Drill II

## 1. NORMAL ENTRY

- Push two thumb latches to open door, located on left side of fuselage.
- Pull handle out until engaged and rotate clockwise to unlock and raise canopy. Give canopy assistance while rotating handle.

## NOTE:

Canopies are secure when raised to full open position.

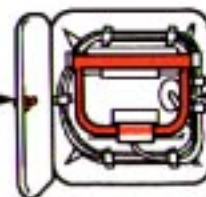
## 2. EMERGENCY ENTRY

- Push thumb latch on canopy jettison access door, located left and right side of forward fuselage, to open.
- Pull canopy jettison D-handle, located on left and right side of fuselage, approximately 6 feet to jettison canopy.

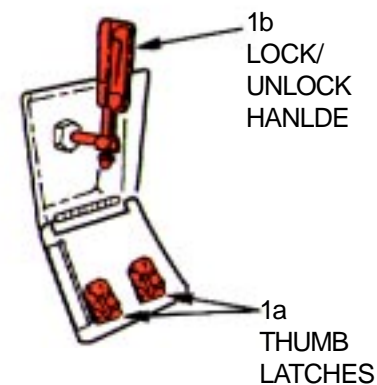
## 3. CUT-IN

- Cut canopy along canopy frame on all four sides with power rescue saw.

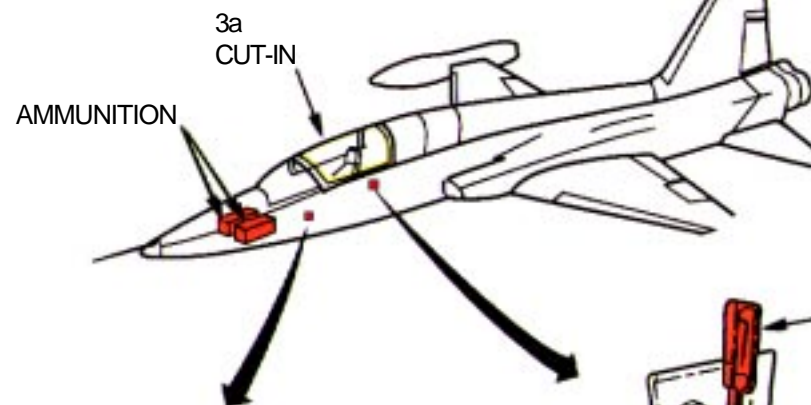
2a  
CANOPY JETTISON  
ACCESS DOOR  
THUMB LATCH



2b  
CANOPY  
JETTISON  
D-HANDLE

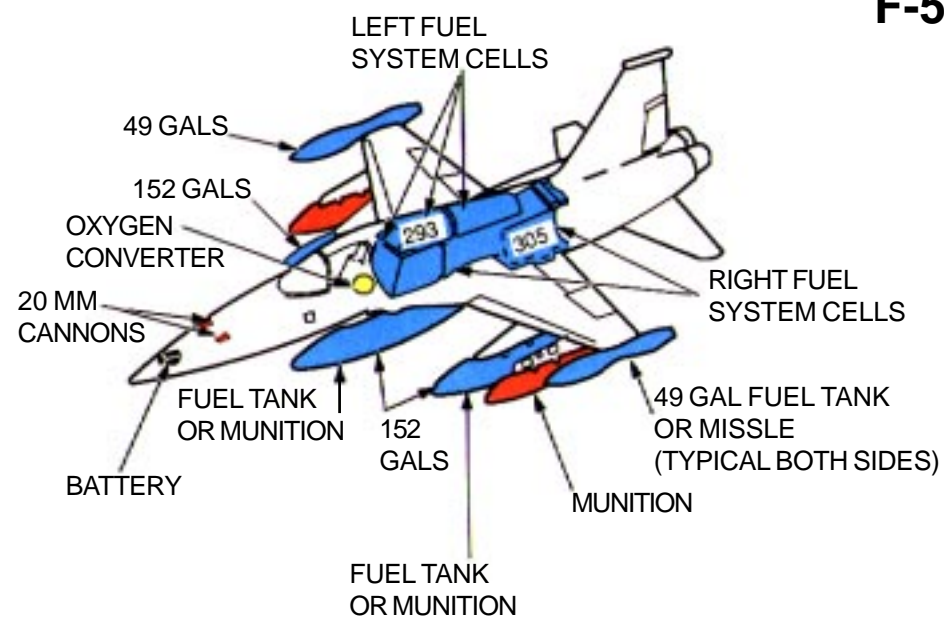


1a  
THUMB  
LATCHES



AMMUNITION

3a  
CUT-IN



LEFT FUEL  
SYSTEM CELLS

49 GALS

152 GALS

OXYGEN  
CONVERTER

20 MM  
CANNONS

FUEL TANK  
OR MUNITION

BATTERY

FUEL TANK  
OR MUNITION

152  
GALS

MUNITION

RIGHT FUEL  
SYSTEM CELLS

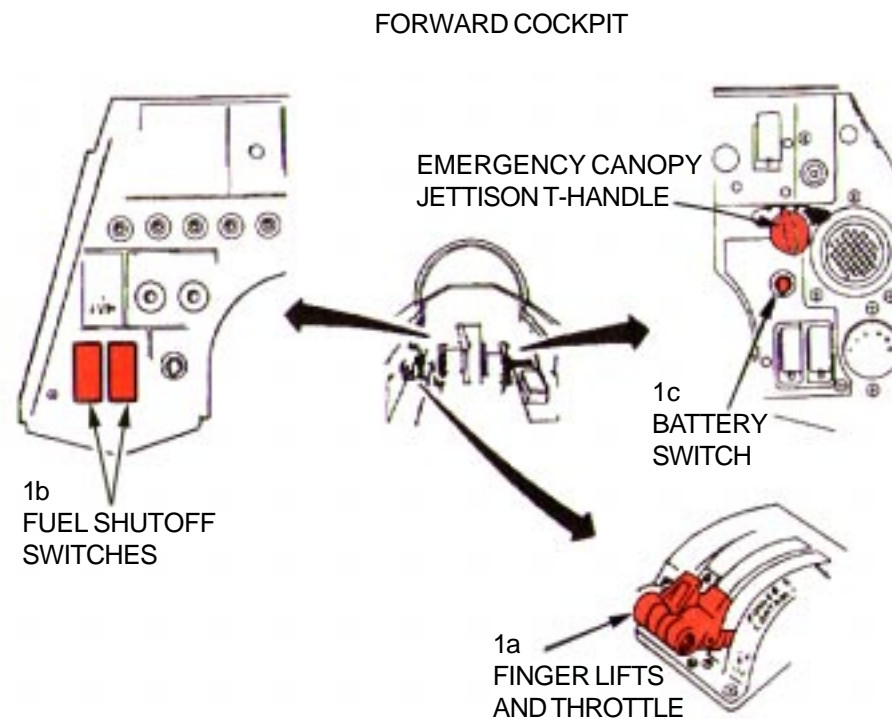
49 GAL FUEL TANK  
OR MISSILE  
(TYPICAL BOTH SIDES)

F-5

# ENGINE SHUTDOWN

## 1. ENGINE SHUTDOWN

- a. Raise finger lift and retard throttle, located on left console panel in the forward cockpit, to full aft OFF position.
- b. Lift the two red guards and place fuel shutoff switches, located on left vertical panel in the forward cockpit, to the CLOSED position.
- c. Place battery switch, located on right vertical control panel in the forward cockpit, to OFF position.



# SAFETYING EJECTION SYSTEM AND AIRCREW EXTRACTION

## 1. NORMAL SAFETYING EJECTION SEAT

- a. Insert seat safety pin in right ejection seat leg brace to prevent inadvertent ejection.

### NOTE:

Flight status safety pins are stored in container mounted on left forward console.

## 2. EMERGENCY SAFETYING EJECTION SEAT

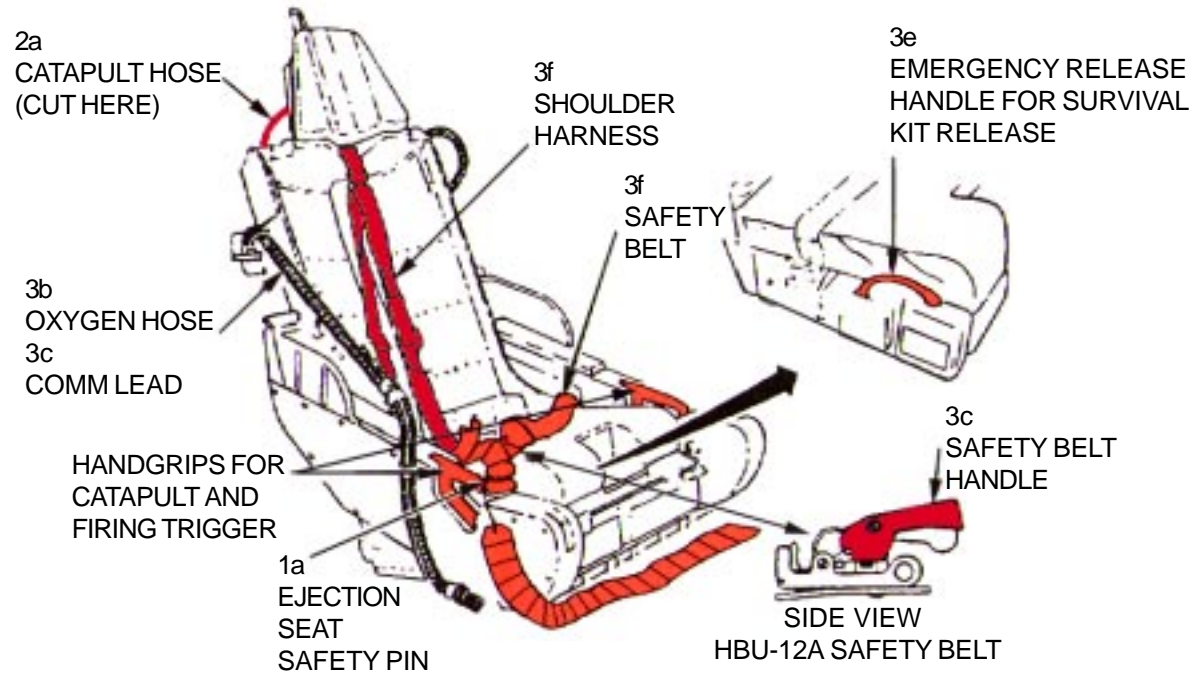
- a. Cut catapult hose, located right side and aft of headrest. (Hose will be yellow color coded.)

### NOTE:

Disarming tool initiator head opening must be 90 degrees to the handle.

## 3. AIRCREW EXTRACTION

- a. Disconnect crewmember's mask at side clip.
- b. Disconnect normal and emergency oxygen hoses on right side of seat.
- c. Disconnect communication lead on oxygen hose.
- d. Disconnect G suit hose on left side of seat.
- e. Pull up on emergency release handle, located next to crewmember's right leg, to separate crewmember from survival kit.
- f. Rotate safety belt knob and remove shoulder harness from crewmember(s).
- g. On HBU-12A lap belt, squeeze together the black and silver grips of the handle and lift up. Separate belt. Remove stow gold key behind parachute harness. Remove shoulder harness/negative "G" restraint strap loop ends.
- h. Pull legs up and extract crewmember over left side.



TYPICAL EJECTION SEAT  
FORWARD AND AFT COCKPITS

# SAFETYING EJECTION SYSTEM AND AIRCREW EXTRACTION FOR ALL F-5F

## 1. NORMAL SAFETYING EJECTION SEAT

- Insert seat safety pin in right ejection seat leg brace to prevent inadvertent ejection.

## 2. EMERGENCY SAFETYING EJECTION SEAT

- Cut catapult hose, located right side and aft of headrest.

### NOTE:

Disarming tool initiator head opening must be 90 degrees to the handle.

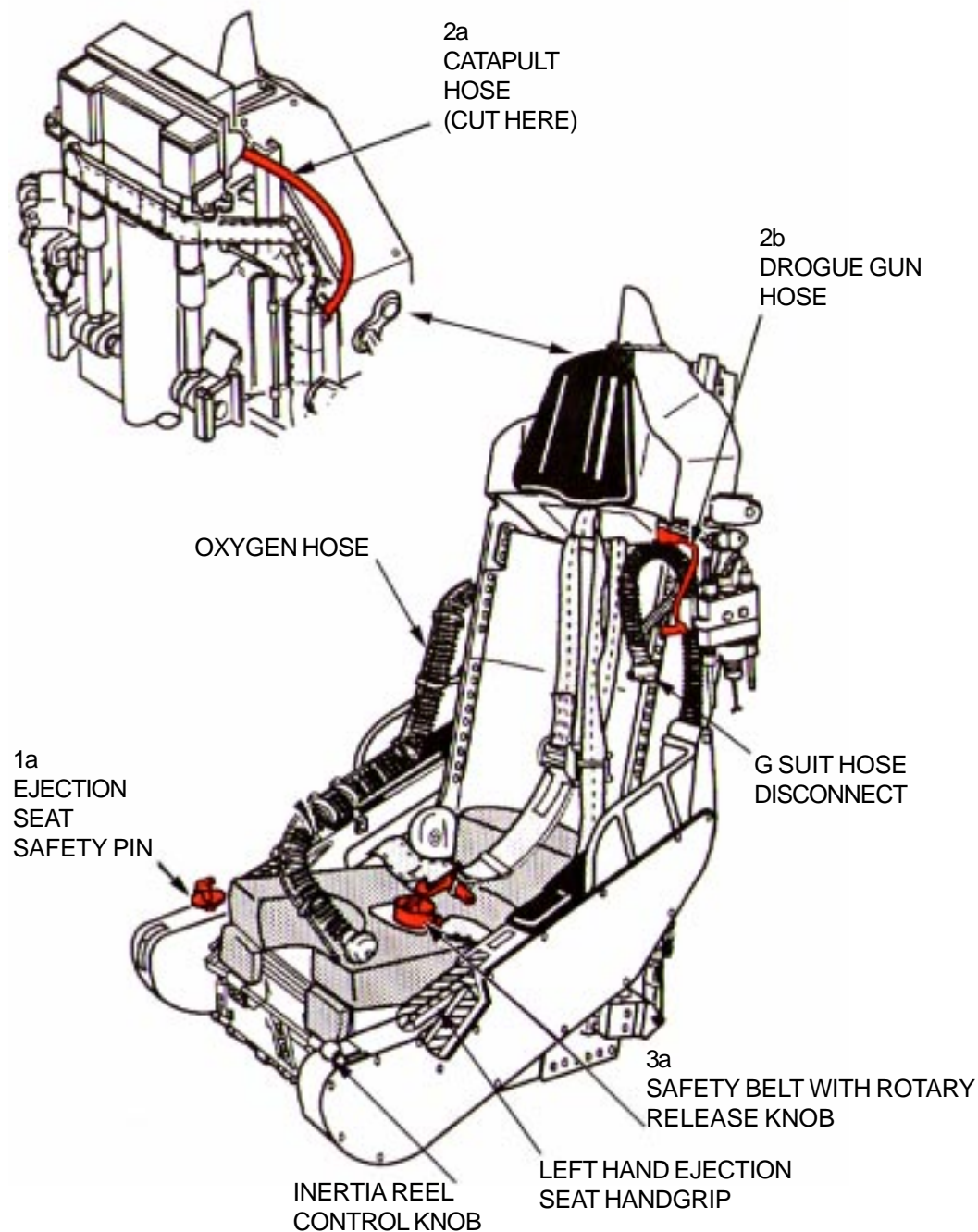
- Cut Drogue Gun ballistic hose on top left side of seat.

## 3. AIRCREW EXTRACTION

### NOTE:

Apply all extraction steps from page F-5.4. Safety belt release will differ. See step below.

- Rotate rotary release knob to release safety belt and then remove shoulder harness from crewmember(s).





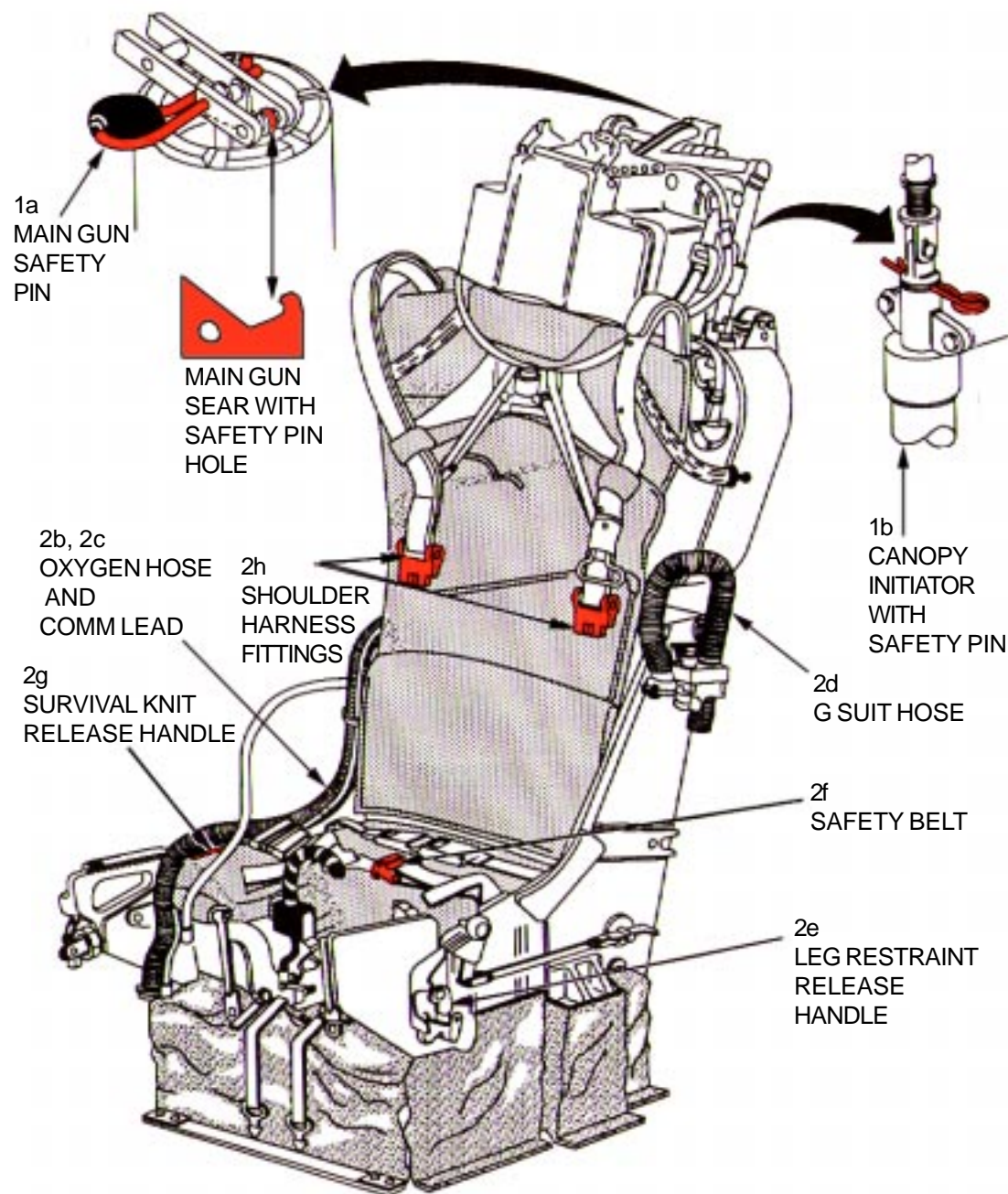
# SAFETYING EJECTION SYSTEM AND AIRCREW EXTRACTION FOR F-5E/F

## 1. SAFETYING EJECTION SEAT

- a. Insert safety pin in Main Gun Sear, located on top of seat.
- b. Insert safety pin in canopy initiator if canopy has not been jettisoned.

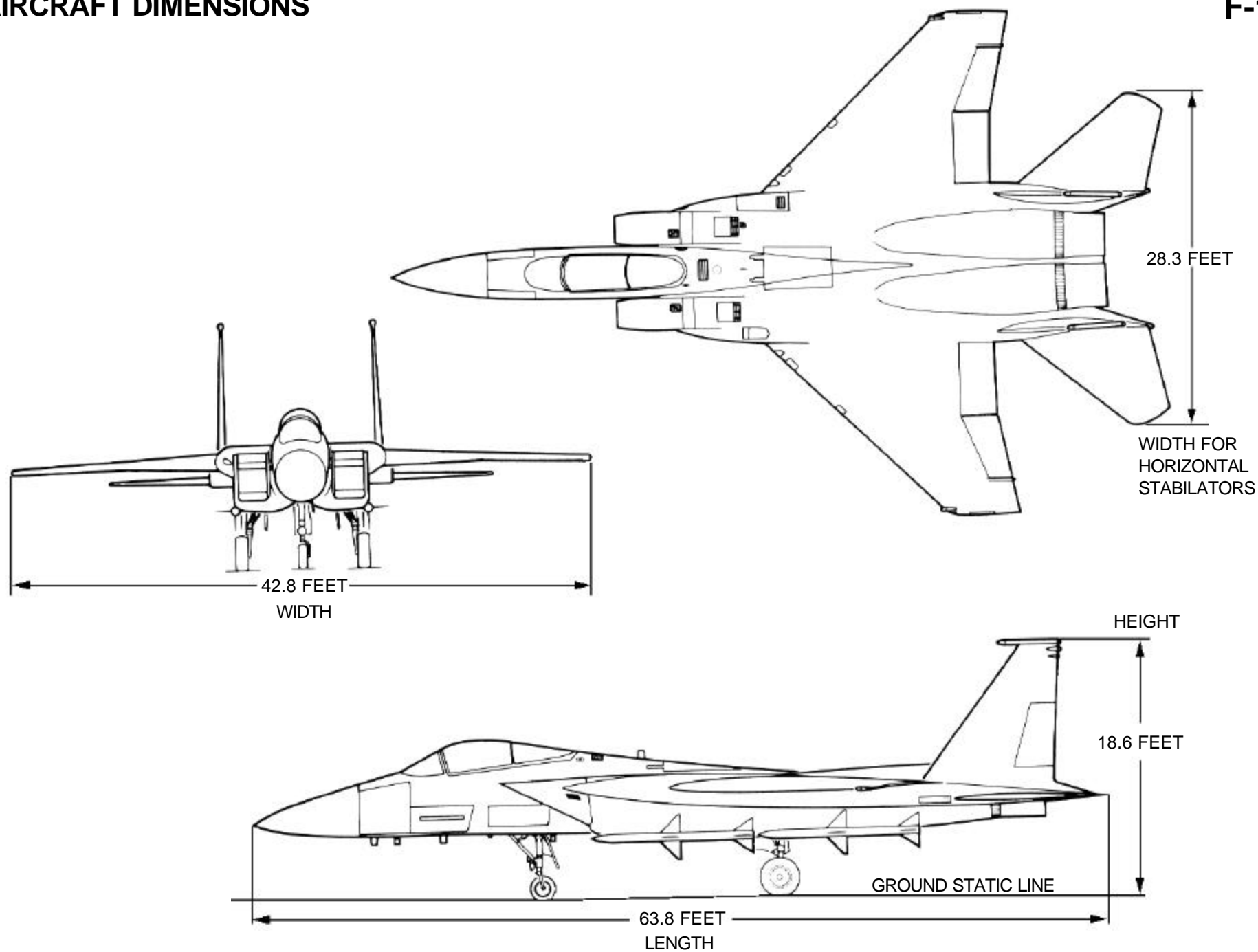
## 2. AIRCREW EXTRACTION

- a. Disconnect crewmember's mask at side clip.
- b. Disconnect normal and emergency oxygen hoses on right side of seat.
- c. Disconnect communication lead on oxygen hose.
- d. Disconnect G suit hose on left side of seat.
- e. Raise leg restraint manual release handle, located on forward outboard left side of seat bucket.
- f. Release safety belt by pulling up on release lever.
- g. Pull survival kit release yellow handle, located on the right forward portion of the survival kit.
- h. Release left and right shoulder harness straps by disconnecting thumb tabs.
- i. Pull legs up and extract crewmember over left side.



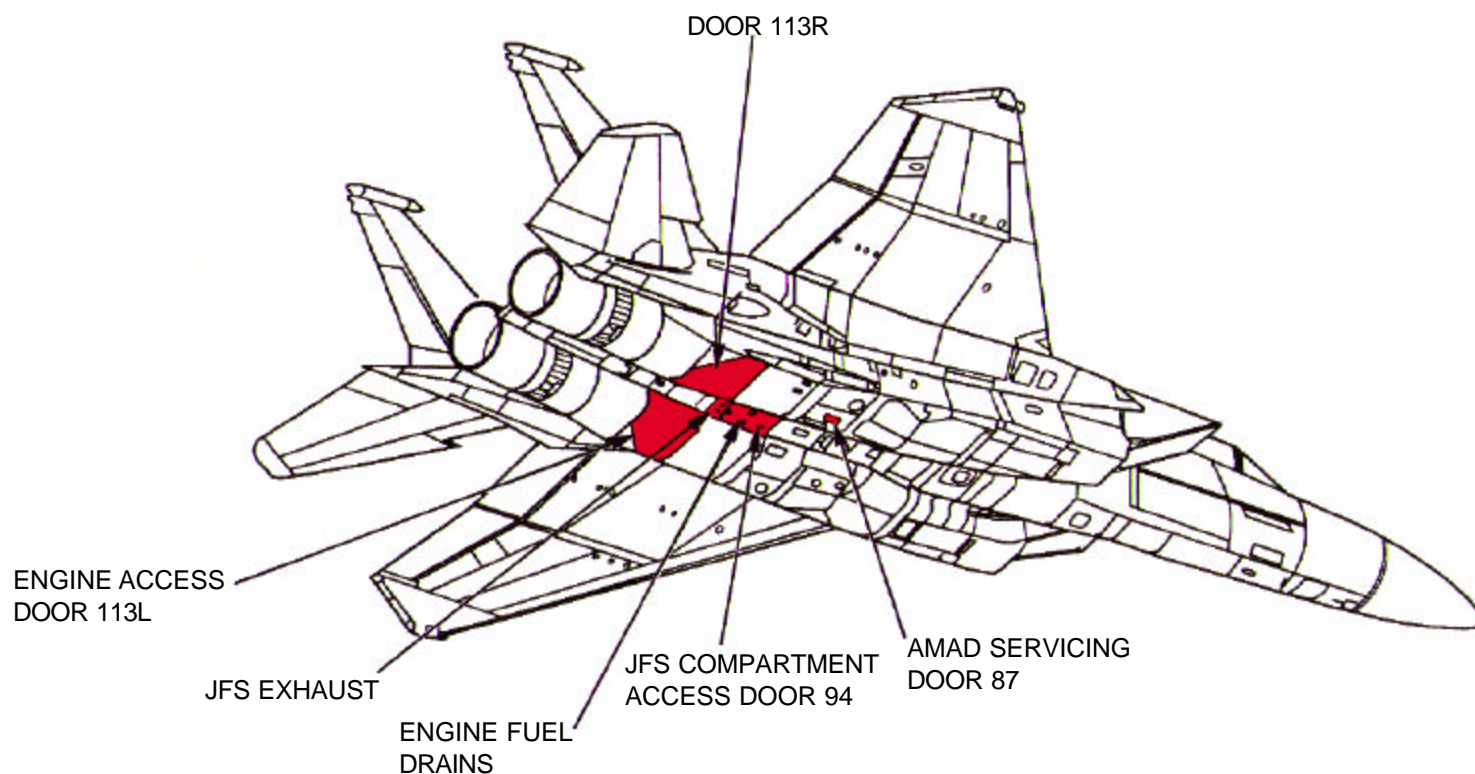
## AIRCRAFT DIMENSIONS

F-15



# GROUND FIRE ACCESS POINTS

F-15



1. Fire access doors are located in the engine compartments, Jet Fuel Starter (JFS), and Airframe Mounted Accessory Drive (AMAD) areas. The engine access doors are located about 6 feet aft of each main landing gear on the sides of the engine compartments; the JFS fire door is located at the aft end of the JFS; and the AMAD servicing door is located just inboard and aft of the right main landing gear. Engine and JFS doors are opened by striking sharply with a fist or by a push of about 45 pounds. The AMAD door contains louvers through which extinguishing agent may be applied.

2. Push buttons and a switch on the fire control panel are located on the upper left side of the pilot's instrument panel. Agent discharge location is selected by first button pushed. Button stays in approximately 1/8 inch when pushed. In event that incorrect button is pushed, push again restoring button to normal position. Then push correct button. Move agent discharge switch up to discharge position. One engine or JFS must be operating to provide power to discharge the Halon 1301 extinguishing agent (6.6 pounds).

# AIRCRAFT HAZARDS-Continued

1. Armament Fwd Fire Zone - 1000 FT.
2. Cannon Fwd Fire Zone - 1000 FT.
3. Radar - 300 ft. personnel - 500 FT.
4. Engine Air Intakes - 25 FT.

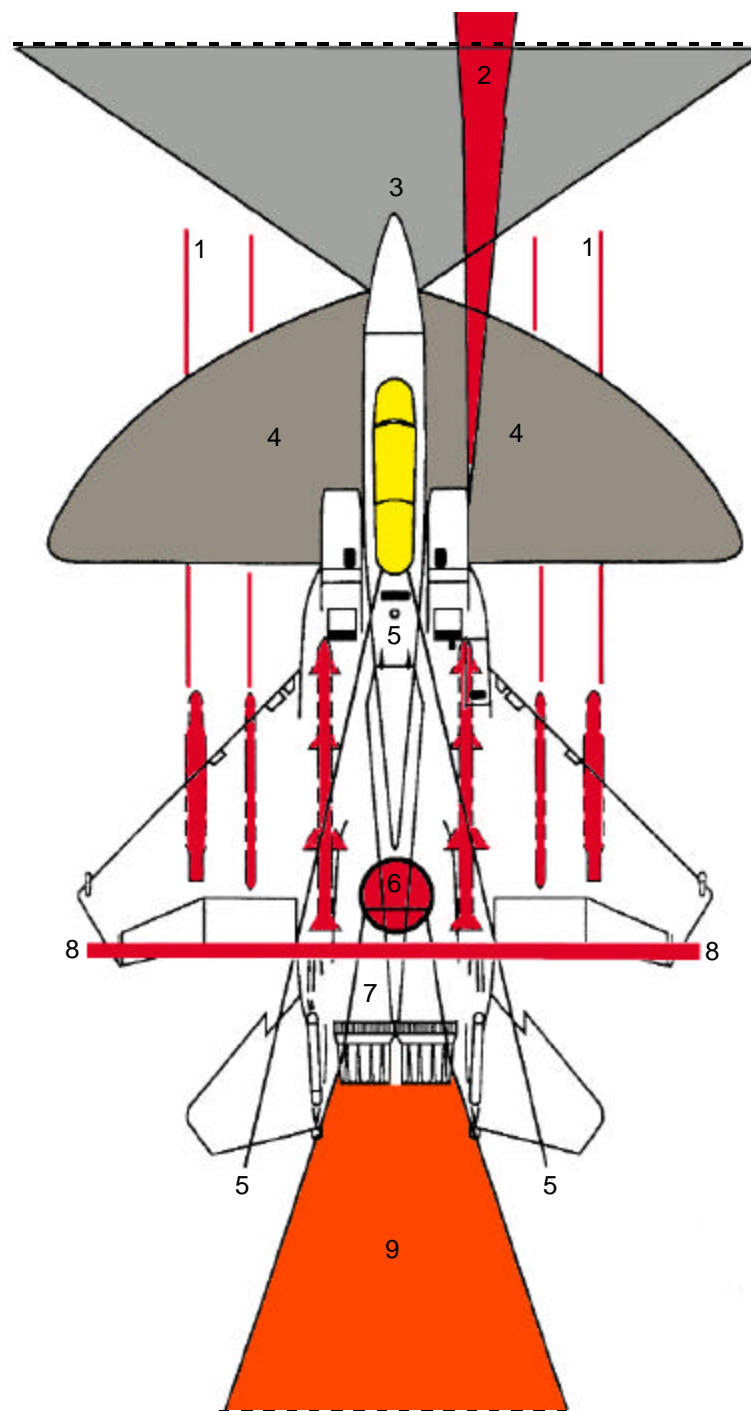
## CAUTION

Danger zone can extend as far as 5 feet aft of the air inlet at high power settings.

5. Canopy Jettison Envelope - 50 FT.
6. Jet Fuel Starter (JFS) Intake - 4 FT.
7. JFS Exhaust - Aft along the centerline to the engine tail cones.
8. Turbine Blade Failure - 300 FT.
9. Engine Exhaust -
  - Intermediate Power Temperature: Above 1000 degrees at the tailpipe.
  - Velocity: Above 1000 MPH at the tailpipe.

## WARNING

10. F-15E model - LANTIRN Pod - Avoid contact during an aircraft mishap! Contains Thorium at the window assembly.
  - Radiation poison through ingestion, inhalation, and absorption through an open wound.
  - Contains Americum - 241 at the Laser Trans/Receiver can result in radiation poison through ingestion and inhalation.





# AIRCRAFT HAZARDS-Continued

F-15

## WARNING

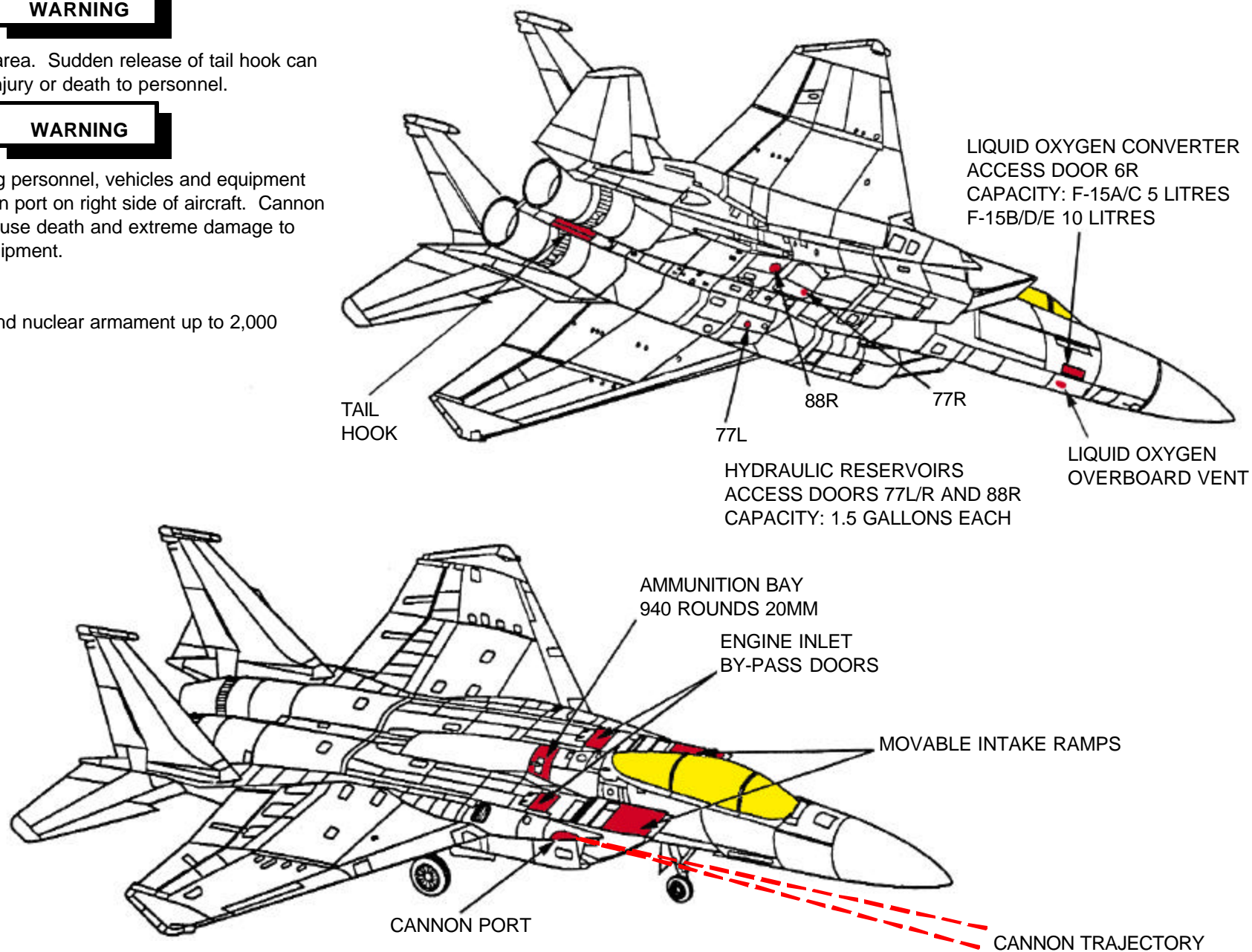
Avoid tail hook area. Sudden release of tail hook can cause serious injury or death to personnel.

## WARNING

Avoid positioning personnel, vehicles and equipment forward of cannon port on right side of aircraft. Cannon operation can cause death and extreme damage to vehicles and equipment.

### NOTE:


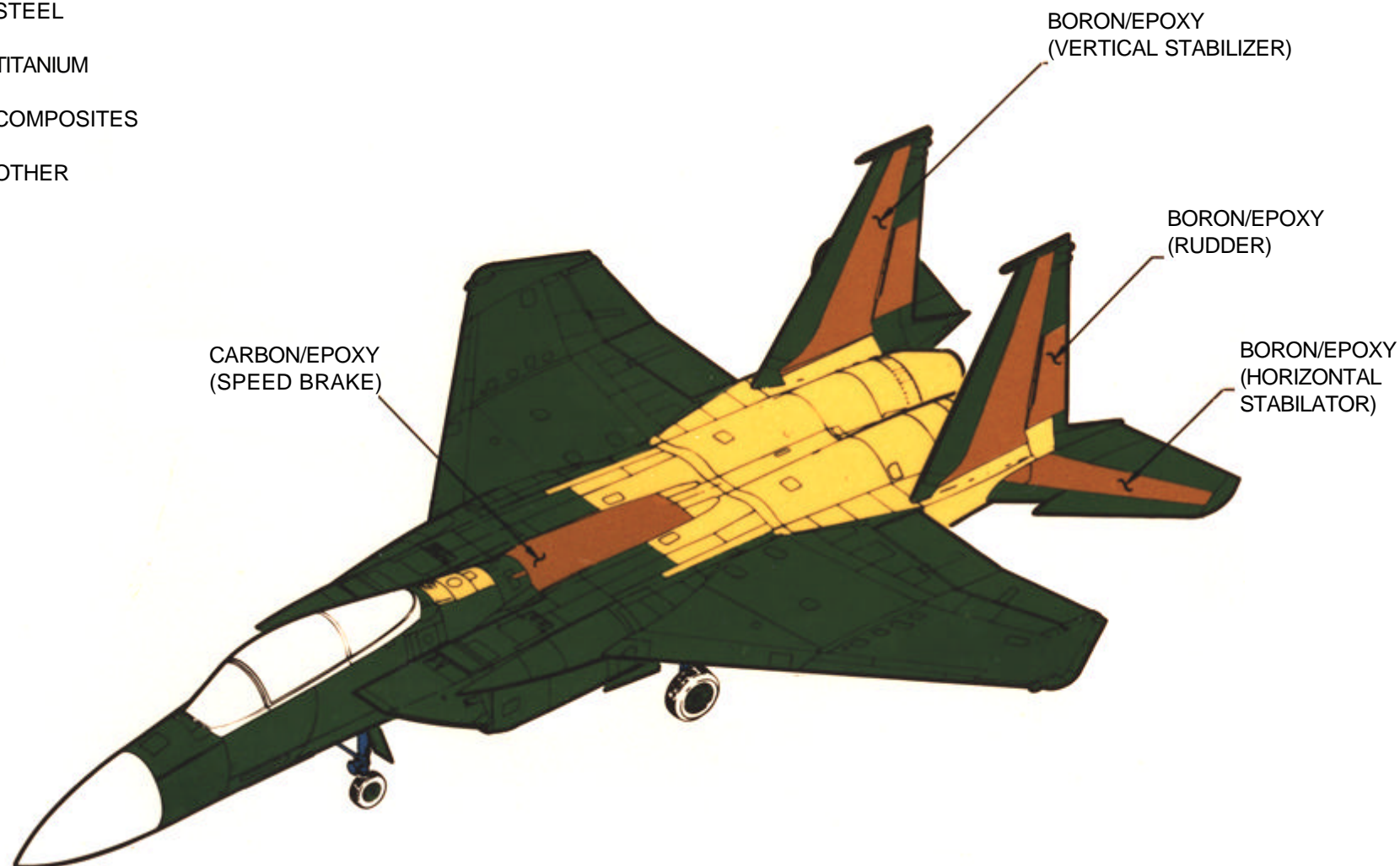
Conventional and nuclear armament up to 2,000 pounds.



# AIRCRAFT HAZARDS

COMPOSITE APPLICATIONS

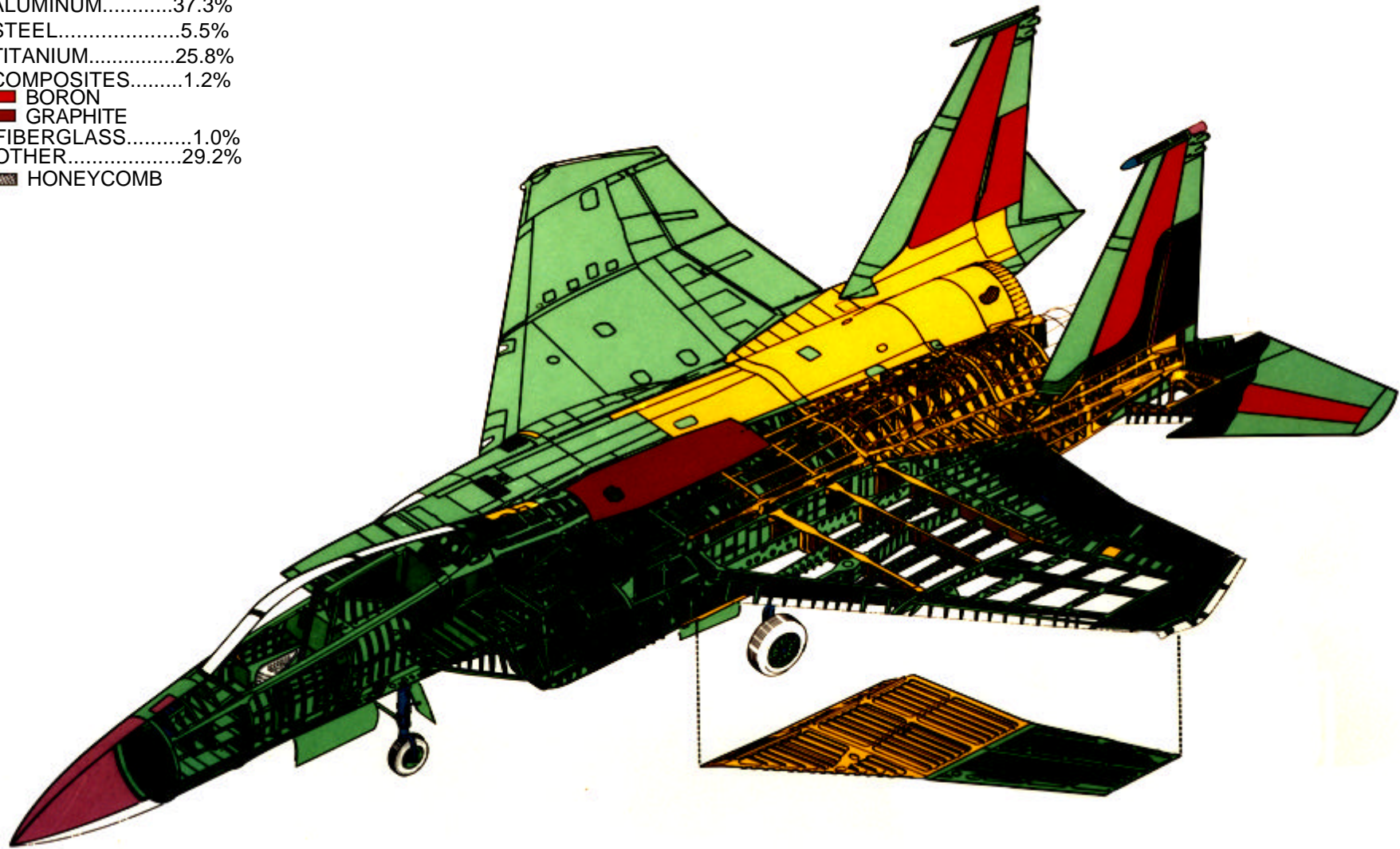
F-15

 ALUMINUM STEEL TITANIUM COMPOSITES OTHER

# AIRCRAFT HAZARDS-Continued

## COMPOSITE/MATERIAL DISTRIBUTION

ALUMINUM.....	37.3%
STEEL.....	5.5%
TITANIUM.....	25.8%
COMPOSITES.....	1.2%
BORON	
GRAPHITE	
FIBERGLASS.....	1.0%
OTHER.....	29.2%
HONEYCOMB	





## SPECIAL TOOLS/EQUIPMENT

Power Rescue Saw      Pri-Ax  
 1/2 Inch Drive Socket Wrench or Breaker Bar  
 Safety Pin P/N C114767-1  
 Battery Powered Drill or Speed Handle with # 14 Apex  
 Dearth Tool              Fire Drill II

## CAUTION

Engine vari-ramps operate in a declined position while engines are running and will automatically return to a horizontal (up) position upon engine shutdown.

## 1. NORMAL ENTRY

- a. Push handle release button on normal control handle, located on the left side of fuselage, allowing the handle to spring out.
- b. Rotate handle fully clockwise to UP position.
- c. Install canopy ground safety lock to brace canopy open.

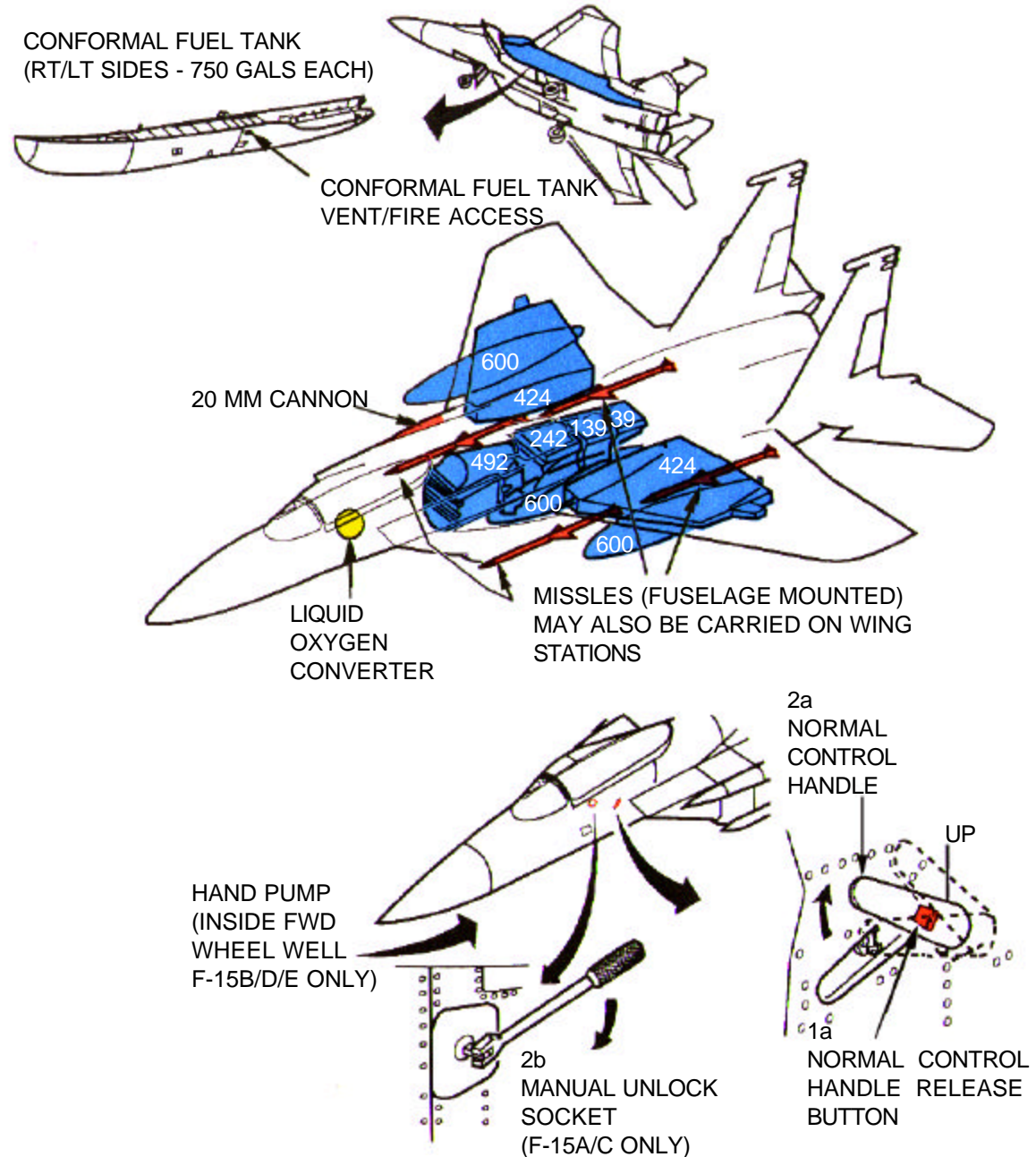
## 2. MANUAL ENTRY

- a. Ensure normal control handle is out and rotated fully clockwise to UP position.
- b. F-15A/C aircraft (single seat): insert 1/2 inch drive socket wrench or breaker bar into manual unlock mechanism, located below the forward leading edge of the canopy, and rotate clockwise. Manually lift canopy and install canopy ground safety lock to brace canopy open.
- c. F-15B/D/E aircraft (two seat): adjust and pin canopy ground safety lock and force canopy aft approximately 1.5 to 2 inches and lift canopy. Install canopy ground safety lock to brace canopy open.

## NOTE:

The canopy on two seat aircraft will require at least two people to lift and hold. If nose gear is down and fwd wheel well is accessible, with 1/2 inch tool, locate hand pump, insert tool and pump to raise canopy hydraulically.

CONFORMAL FUEL TANK  
 (RT/LT SIDES - 750 GALS EACH)





# AIRCRAFT ENTRY-Continued

## 3. EMERGENCY ENTRY

- a. Press button to open door 9, located on left side of fuselage forward of the engine air inlet, and remove canopy jettison T-handle.

### NOTE:

Insure canopy jettison safety pin is removed from canopy jettison initiator before attempting canopy jettison.

- b. Grasp canopy jettison T-handle and extend canopy jettison cable to full length (approximately 8 feet). Stand forward of door 9 to avoid falling canopy.

### WARNING

Avoid canopy impact area during jettison. See page F-15.3 item 5. Impact with personnel can injure or cause death.

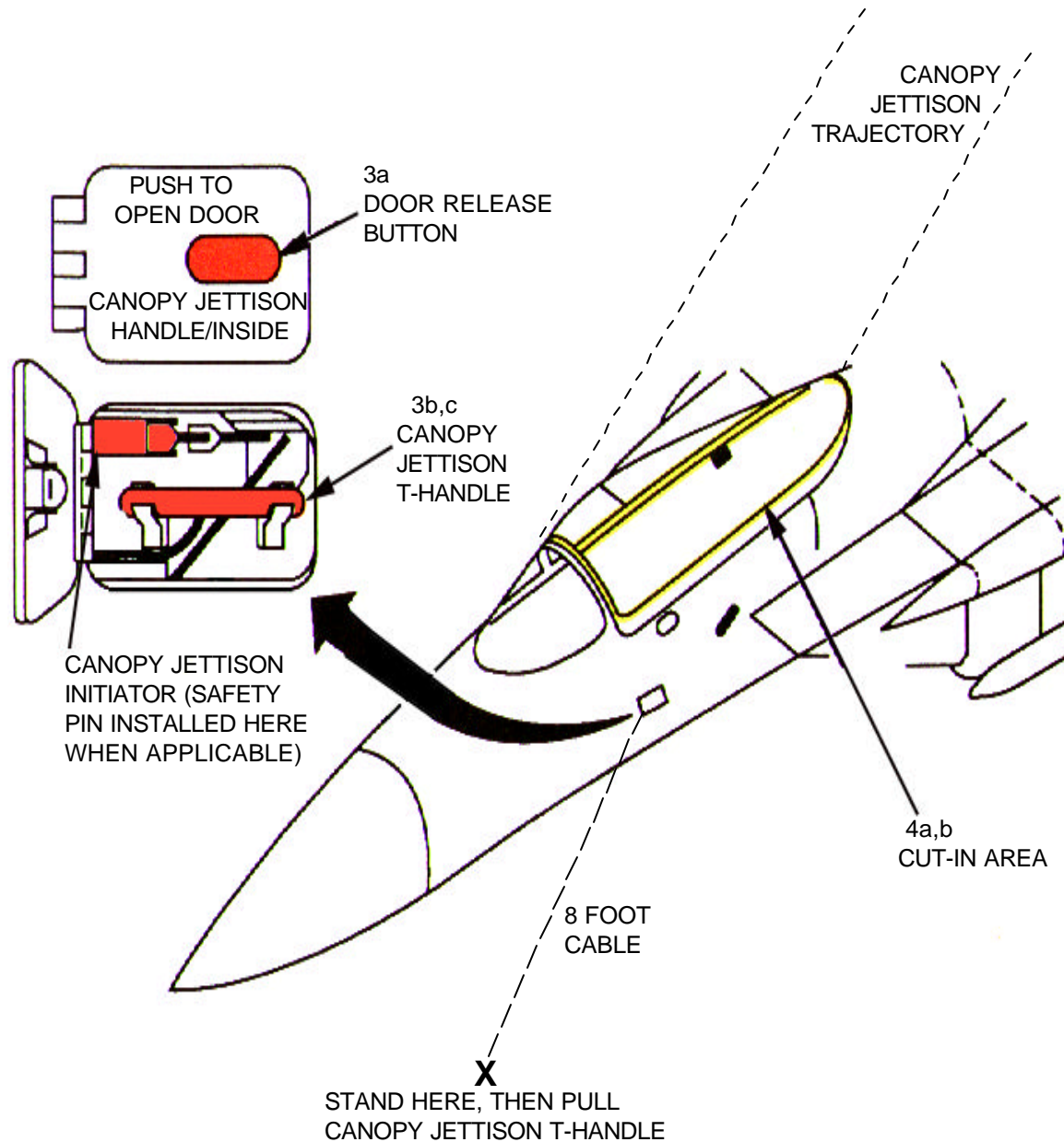
- c. Pull firmly and sharply on T-handle to jettison canopy.

### NOTE:

Due to the strength of the canopy transparency, all sides of the canopy must be cut to reach the crewmember(s).

## 4. CUT-IN

- a. Cut through the canopy transparency, using a power rescue saw with a carbide tipped blade, along the canopy frame.
- b. Make 4 complete cuts and lift transparency up and away from cut-in area.



# ENGINE SHUTDOWN

## 1. ENGINE SHUTDOWN

### NOTE:

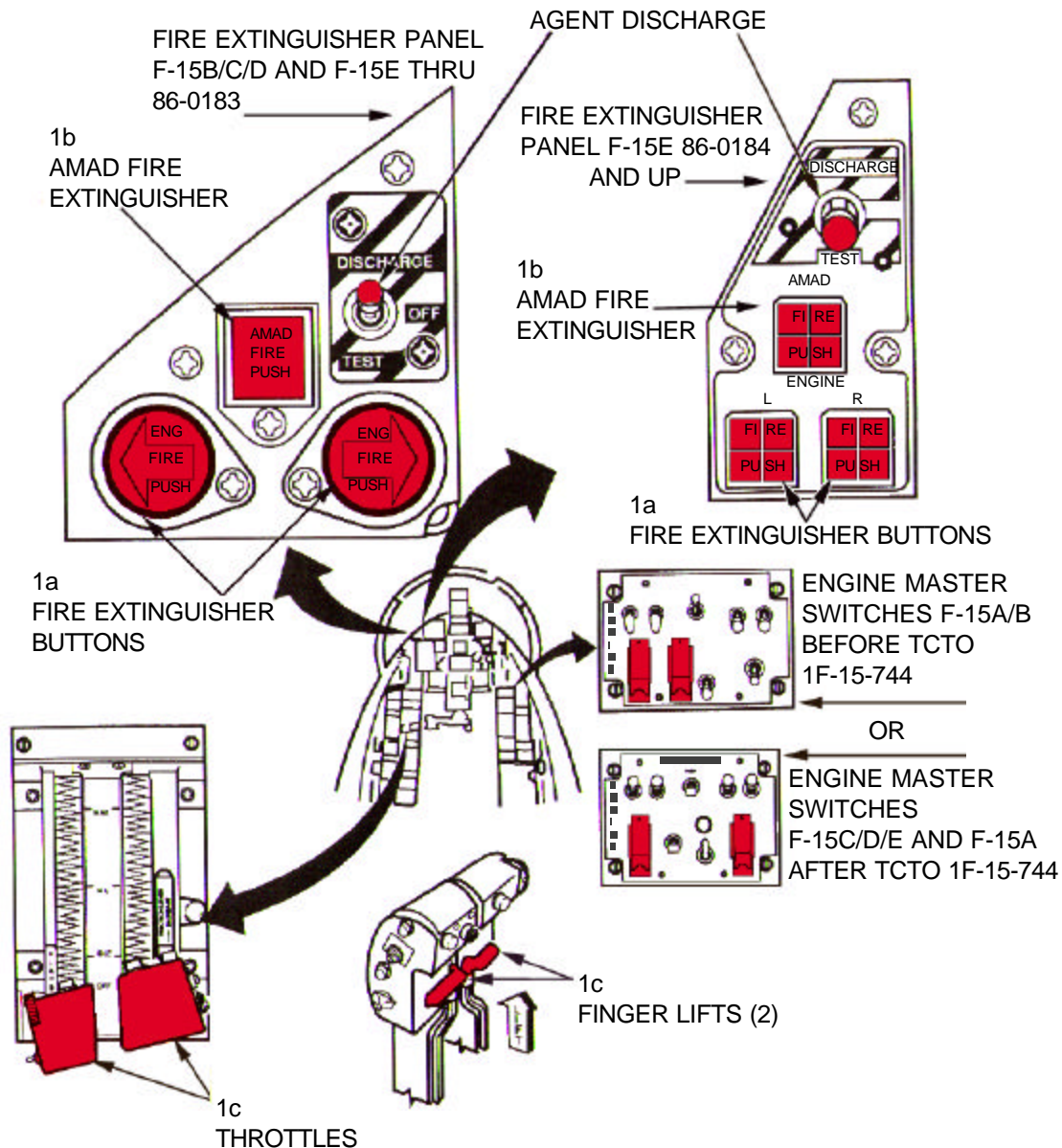
Complete engine shutdown can be accomplished from only the front cockpit only. However, if over the left wing access to cockpit is used, the engines can be positioned to idle from the rear cockpit (two seat aircraft only) reducing the danger of intake suction.

- On F-15E 86-0184 and up, guard must be lifted before pressing fire extinguisher buttons.
  - Operation of Main Engine fire buttons automatically closes the engine fuel shutoff valves and eliminates the need to position the engine master switches to OFF. Engine master switches are positioned side-by-side on F-15A/Bs before TCTO 1F-15-744. The switches are separated on F-15C/D/E and F-15As after TCTO 1F-15-744.
  - One engine must be operating to provide 28 volt DC power for operation of the Main Engine fire extinguisher system.
- a. Depress the left and right engine fire extinguisher buttons in the front cockpit located on the upper left side of the pilot's instrument panel. This action closes the engine fuel shutoff and bleed air.

### NOTE:

The jet fuel starter (JFS) must be running to provide 28 volt DC power for operation of the AMAD fire extinguisher system.

- b. In event JFS is running (during engine start) push AMAD fire buttons located on the upper left side of pilot's instrument panel. This closes the JFS fuel shut-off relay.
- c. Raise finger lifts on throttles and pull back to below IDLE. Release finger lifts and move throttles to OFF.



# ENGINE SHUTDOWN-Continued

## 2. EXTERNAL ENGINE SHUTDOWN (LEFT ENGINE)

READ THE FOLLOWING WARNINGS AND NOTES TO DETERMINE F-15 ENGINE VERSION FOR THIS PROCEDURE.

### WARNING

External engine shutdown cannot be accomplished with conformal fuel tanks installed.

### NOTES:

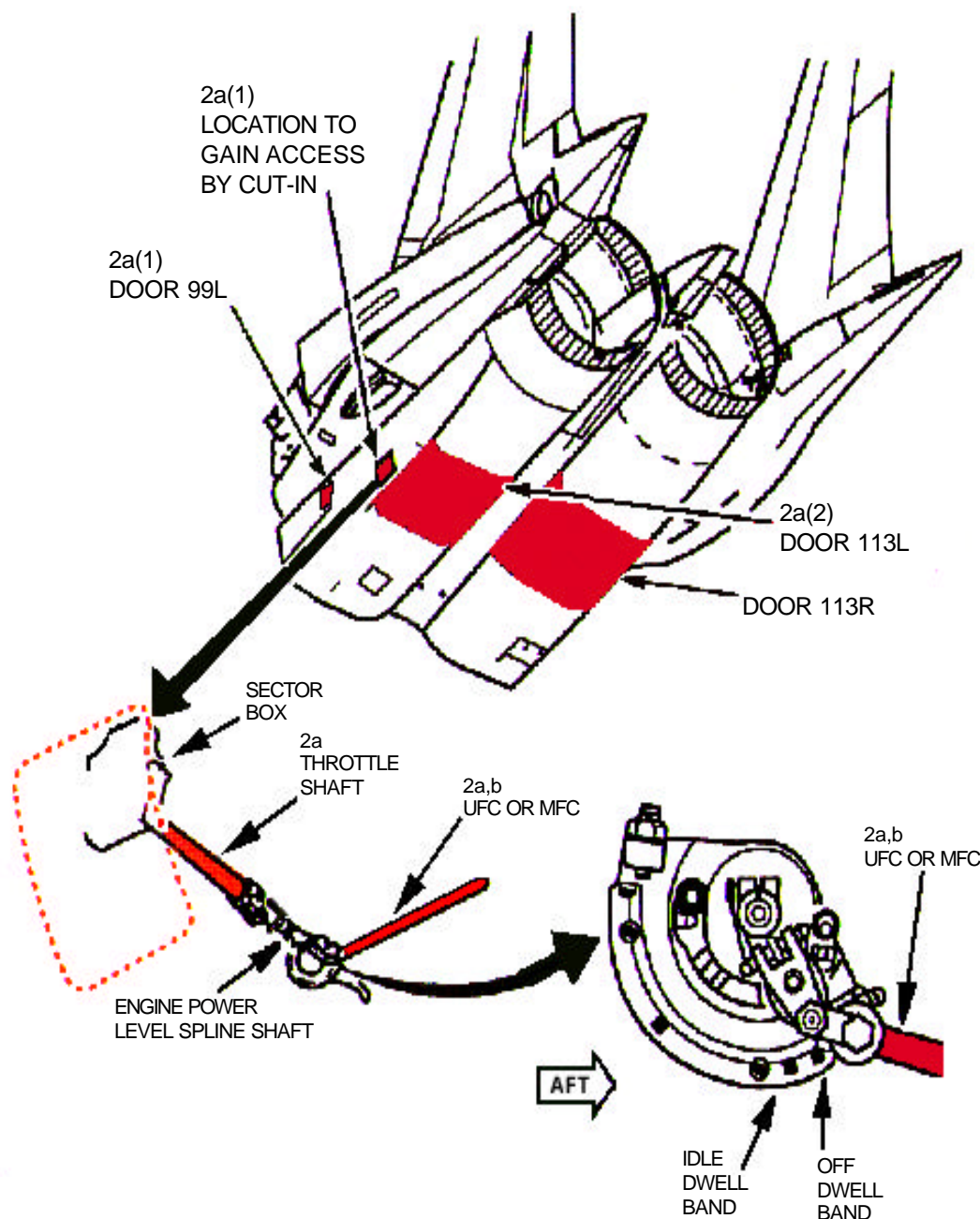
- External left engine shutdown procedures will be used only if engine shutdown from the cockpit is unsuccessful or impractical. If conditions warrant, the left engine may be shutdown using two external methods.
- The throttle linkage for F-15s are connected to three different engine fuel controls: (1) The Unified Fuel Control (UFC) for Pratt-Whitney (PW) F100-PW-100 engine, (2) Main Fuel Control (MFC) for PW F100-PW-220/-220E, and (3) MFC for PW F100-PW-229 engine.
- On engine shutdown for the F100-PW-229 MFC fuel flow is cut off immediately and stores the residual fuel. No fuel will be drained over board.

a. To gain access to the UFC or MFC and throttle shaft:

- (1) Cut a hole, using the power rescue saw, through the aircraft skin approximately 25 to 30 inches aft from aft edge of engine fire access door 99L.

OR

- (2) Gain access through door 113L use a #14 apex with adapter, using a speed handle or a battery powered drill.



## ENGINE SHUTDOWN-Continued

### 2. EXTERNAL ENGINE SHUTDOWN (LEFT ENGINE)- Continued

**NOTE:**

Use illustration on page F-15.10.

**WARNING**

On engine shutdown with F100-PW-100 and -220/-220E engines, drain approximately 1/2 gallon of hot fuel overboard from the P&D valve, located forward of the UFC or MFC. Remain clear of the P&D drain, located under panel 113L, immediately after shutdown. F-15s with F100-PW-229 engines do not drain fuel overboard after shutdown.

**WARNING**

Beware of hot fuel draining overboard from P&D valve drain.

- b. Rotate the UFC or MFC linkage counterclockwise to cut-off indication (aft) and hold until engine operation ceases.

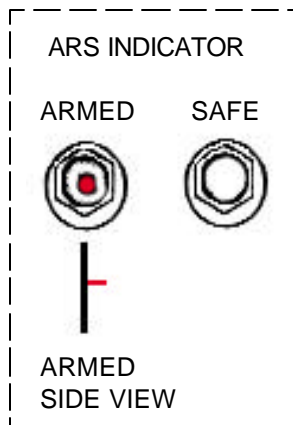


# EJECTION SEAT INDICATOR

## 1. EJECTION SEAT INDICATOR

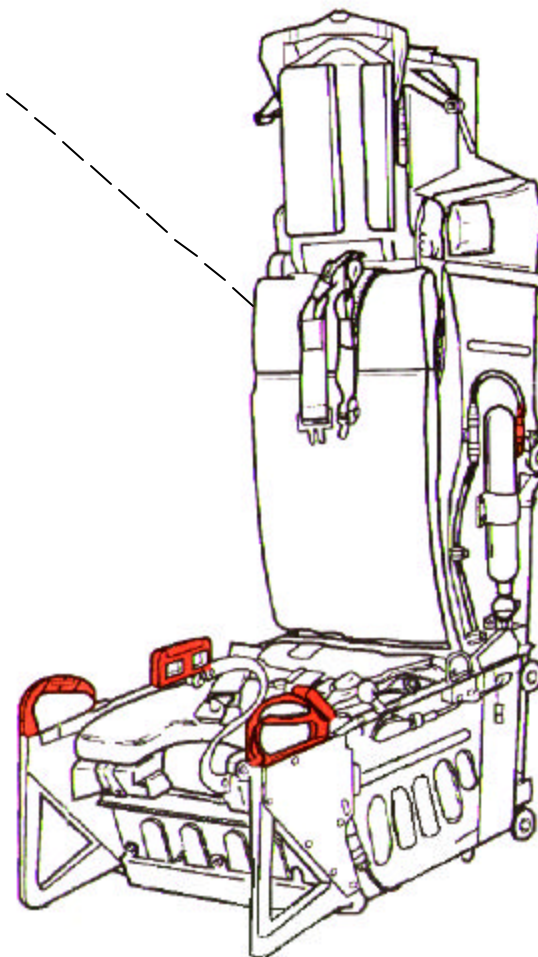
### WARNING

A Seat Armed Indicator located on the upper right side of the seat can indicate WHITE for OK and RED for SEAT ARMED. This indicates that the Advanced Recovery Sequencer (ARS) battery condition is serviceable or expended. If expended, the white sealant will be punctured by a protruding red pin. If this is a recent condition, it will take two hours for the seat to be considered safe to work around or remove. Electrical battery power is required to energize the recovery sequencer circuits for the numerous explosives on the seat. Use extreme caution and judgement in this case. If time permits, call the local Egress Shop before proceeding. If emergency exists and time does not allow inspection by the Egress Shop, sever all exposed ballistic lines including top of seat for the rocket catapult.



### NOTE:

Do not touch indicator sealant when checking condition. Frequent touching wears off sealant exposing tip of red pin indicating a false ARMED ARS condition.



# SAFETYING EJECTION SEAT

## WARNING

The seat is armed regardless of canopy position. Jettisoning the aircraft canopy automatically arms the ACES II ejection seat. On two seat aircraft, both seats must be safetied before either can be considered safe. Prior to entering the cockpit, locate the FIRED WARNING INDICATOR on seat bulkhead left side near canopy sill. A red spiral indicator will indicate system actuation or system malfunction if seat(s) are still in aircraft. Use EXTREME CAUTION under these circumstances; system can still actuate!

### 1. NORMAL SAFETYING of EJECTION SEAT(S)

- a. Rotate Ground Safety Lever, located left side of seat directly aft of the left Ejection Control Handle, UP and Forward.

#### NOTE:

The Ejection Control Handle safety pin can ONLY be installed from the forward inboard side of the left handle.

- b. Install safety pin in left Ejection Control Handle.
- c. Install safety pin in the Emergency Manual Chute Handle, located on the right side of the seat. If Ejection Control Handle and Emergency Manual Chute Handle Pin are connected by one safety streamer, route Emergency Manual Chute Handle under aircrew's legs, otherwise extraction will cause entanglement with streamer.

### 2. EMERGENCY SAFETYING of EJECTION SEAT(S) AFTER CANOPY JETTISON

## WARNING

**Rotating the Ground Safety Lever in this situation does not adequately prevent the possibility of inadvertent ejection.**

- a. Rotate Ground Safety Lever, located left side of seat directly aft of the left Ejection Control Handle, UP and Forward.
- b. Insert safety pin in left Ejection Control Handle.
- c. Cut ballistic hoses on left and right sides of seat(s), above disconnects, to prevent ballistic gas from actuating ejection devices, with ballistic hose cutting tool.

EMERGENCY MANUAL CHUTE HANDLE

1c  
SAFETY PIN WITH STREAMER

EMERGENCY MANUAL CHUTE HANDLE

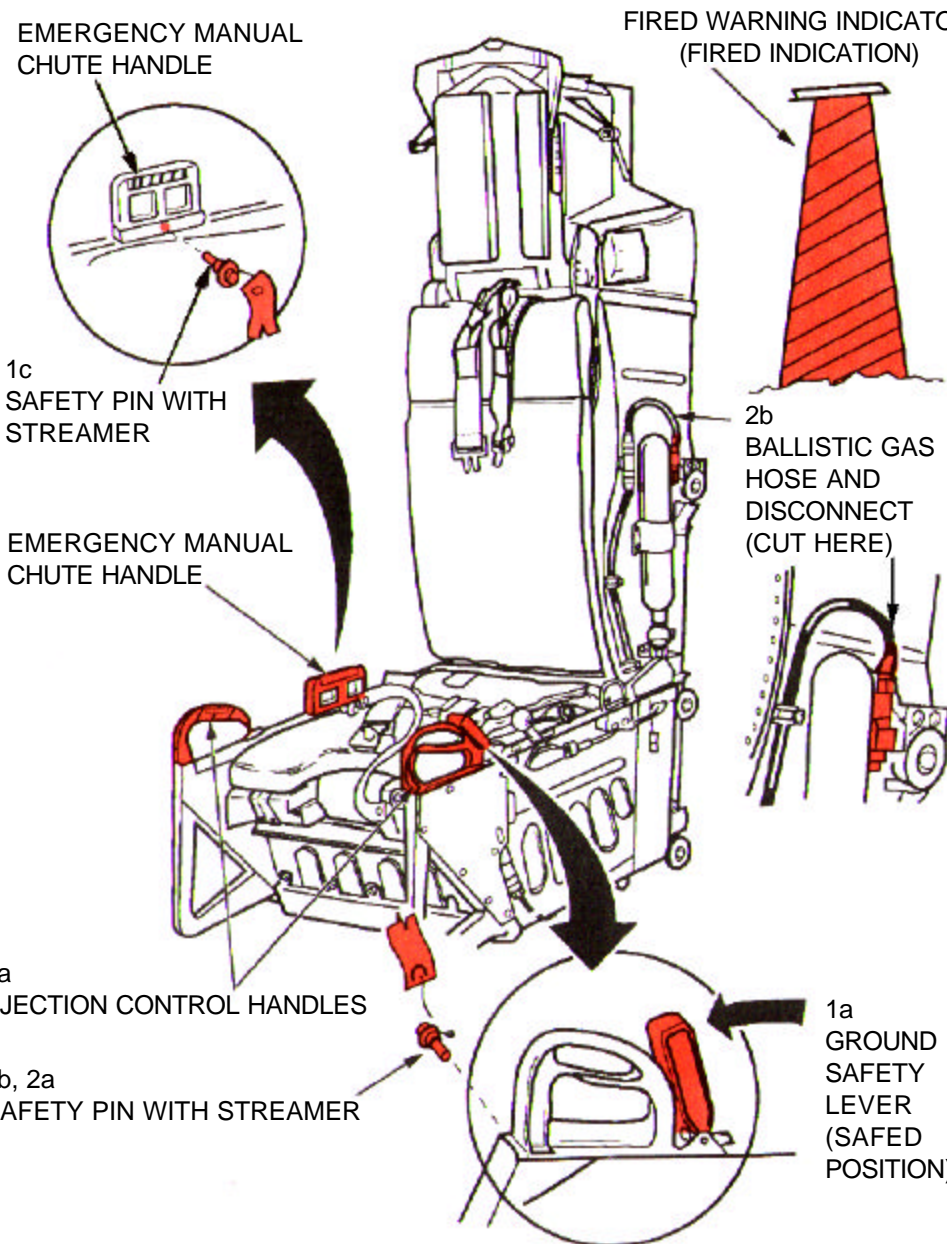
FIRED WARNING INDICATOR (FIRED INDICATION)

2b  
BALLISTIC GAS HOSE AND DISCONNECT (CUT HERE)

1a  
EJECTION CONTROL HANDLES

1b, 2a  
SAFETY PIN WITH STREAMER

1a  
GROUND SAFETY LEVER (SAFED POSITION)



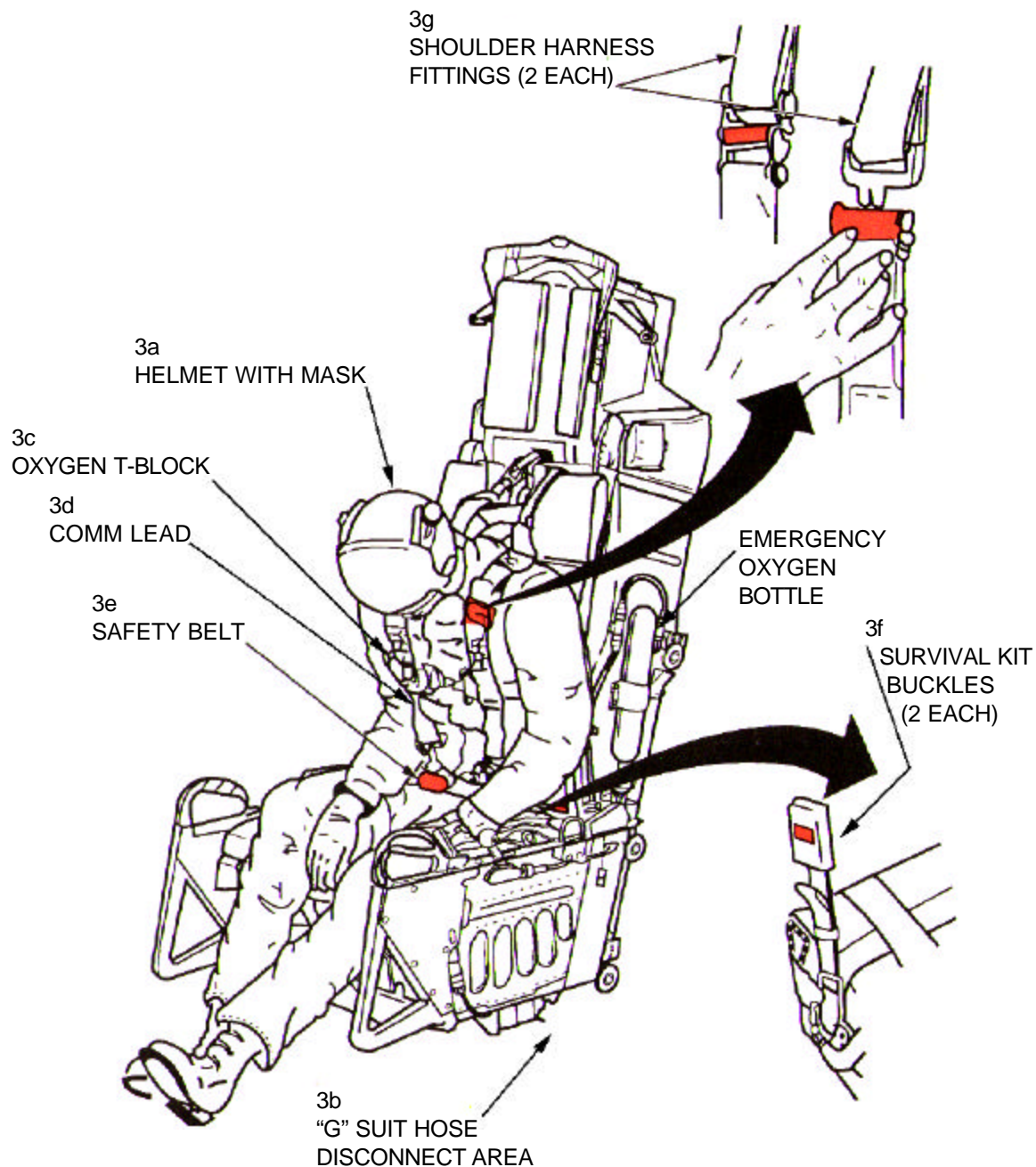
# AIRCREW EXTRACTION

## 1. AIRCREW EXTRACTION

### NOTE:

Pulling the Emergency Manual Chute Handle  
WILL NOT release crewmember.

- a. Unsnap crewmember's mask from helmet on both sides.
- b. Release G suit hose on lower left hand side of seat.
- c. Release oxygen hose and oxygen T block on right hand side of seat. This also disconnects emergency oxygen.
- d. Release communication lead on right hand side of seat.
- e. Release safety belt by lifting cover and pulling release bar.
- f. Release left and right survival kit buckles by depressing PUSH TO RELEASE button on each buckle.
- g. Release left and right shoulder harness fittings by lifting cover and pulling release bar on each fitting.
- h. Extract crewmember over the rescue or left side of the cockpit. Insure that Ejection Control Handles, Ejection Safety Pin, and Ejection Safety Lever are not moved during extraction.





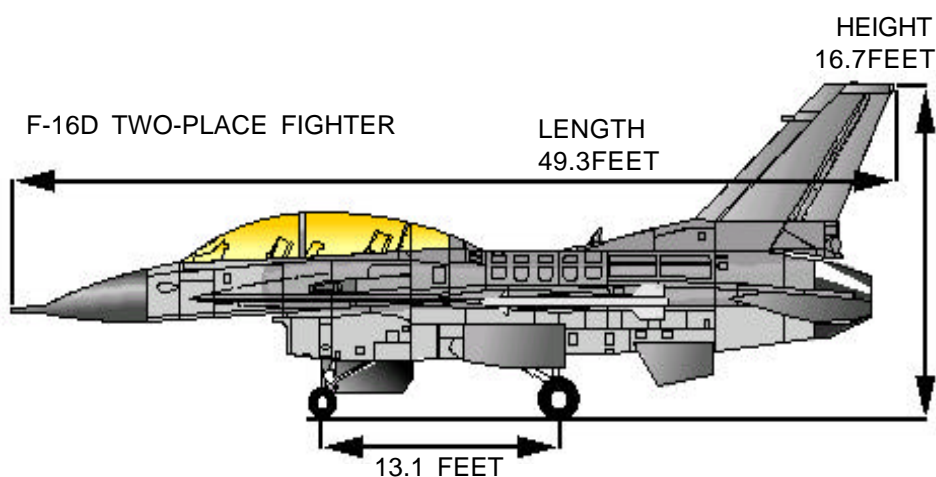
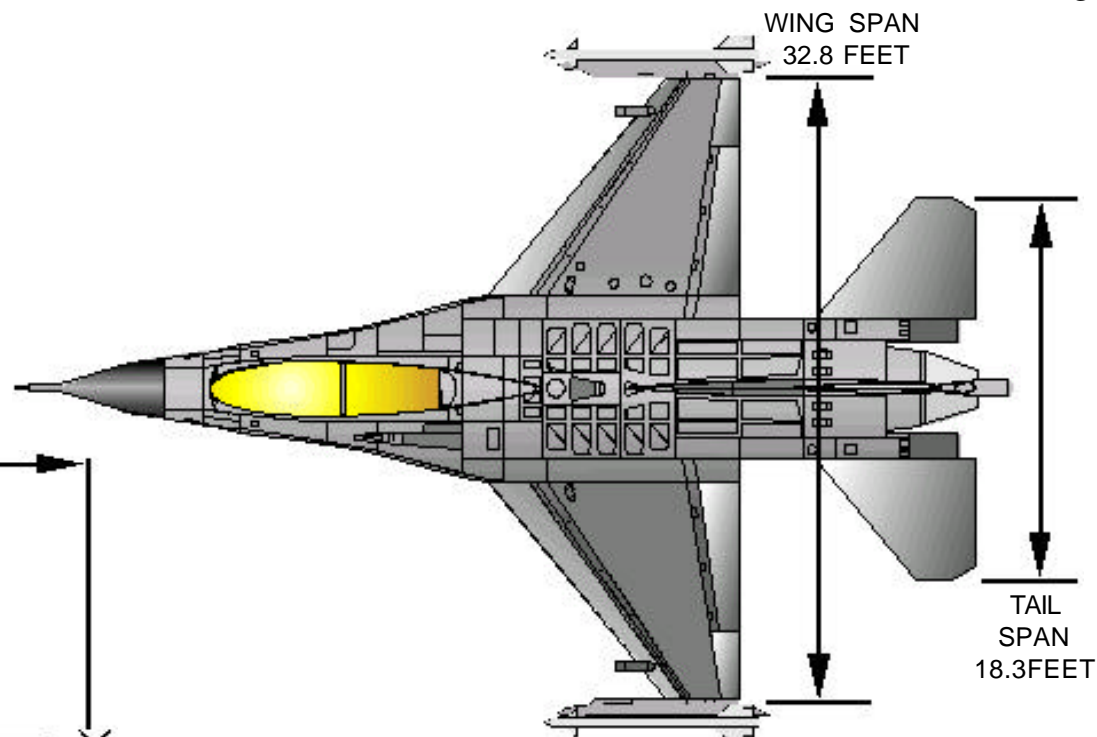
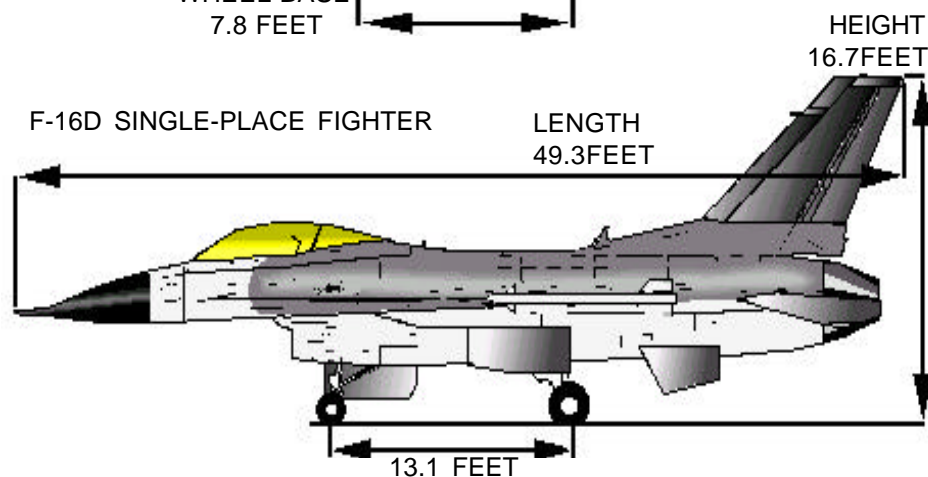
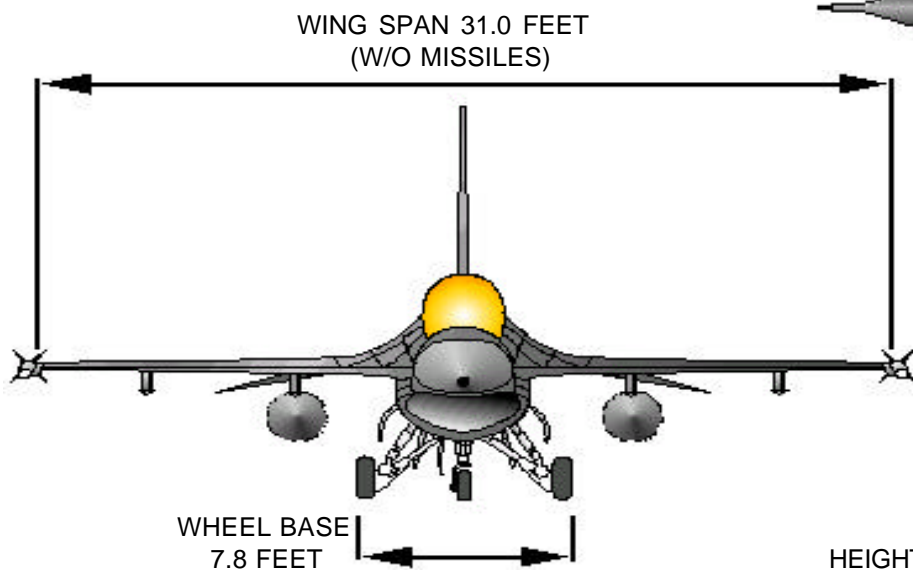
# AIRCRAFT DIMENSIONS

## CHARACTERISTICS:

WING AREA - 300 SQ.FT

LEADING EDGE SWEEP 40 DEGREES

# F-16

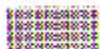


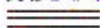


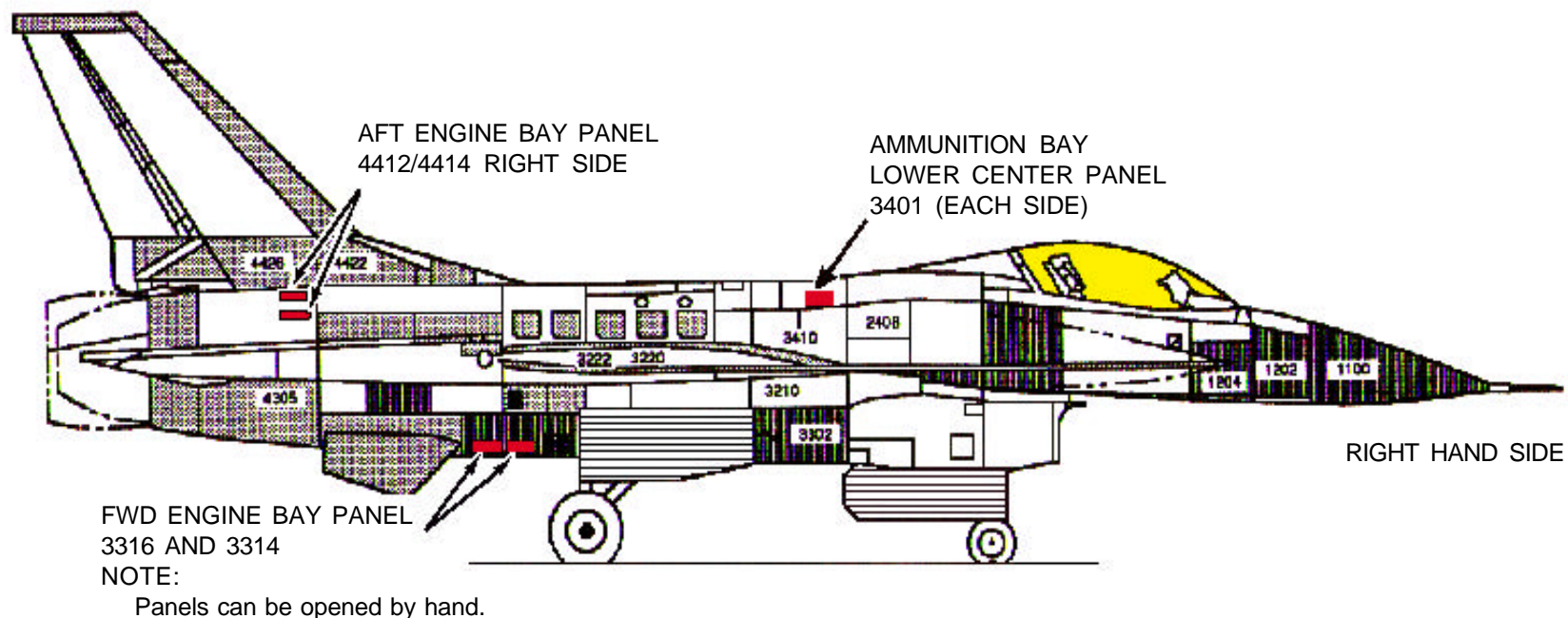
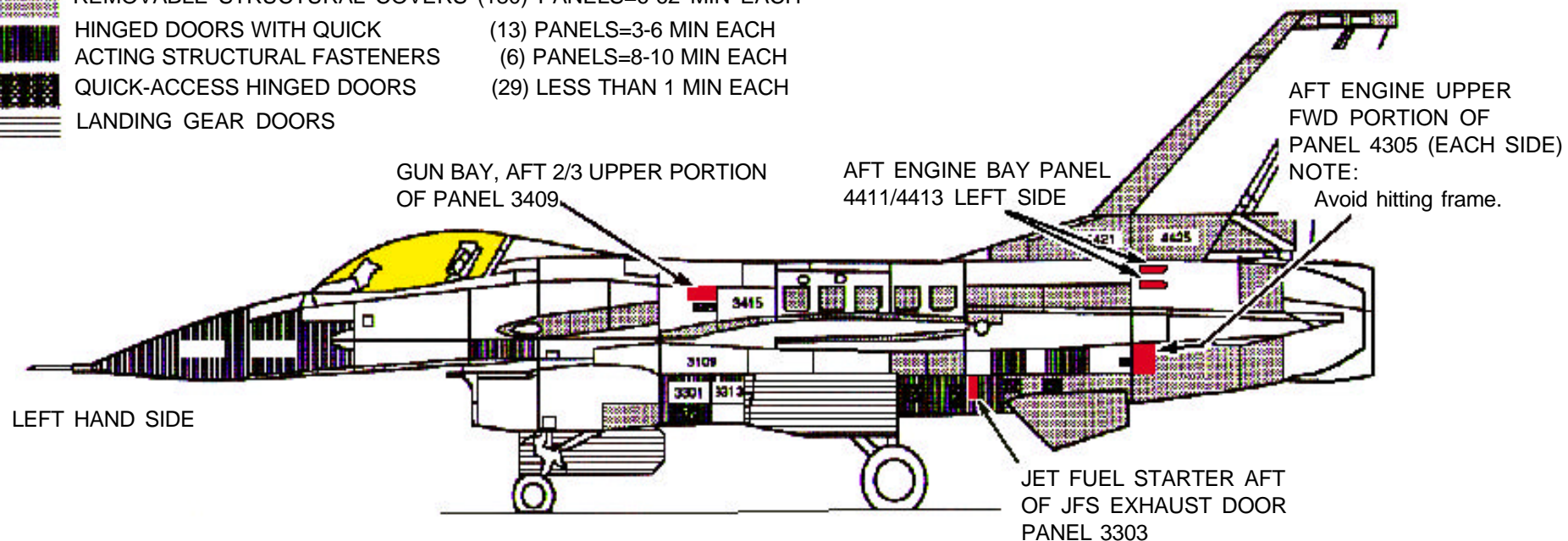


# F-16.2 AIRCRAFT SKIN PENETRATION POINTS AND FIRE ACCESS LOCATIONS





F-16

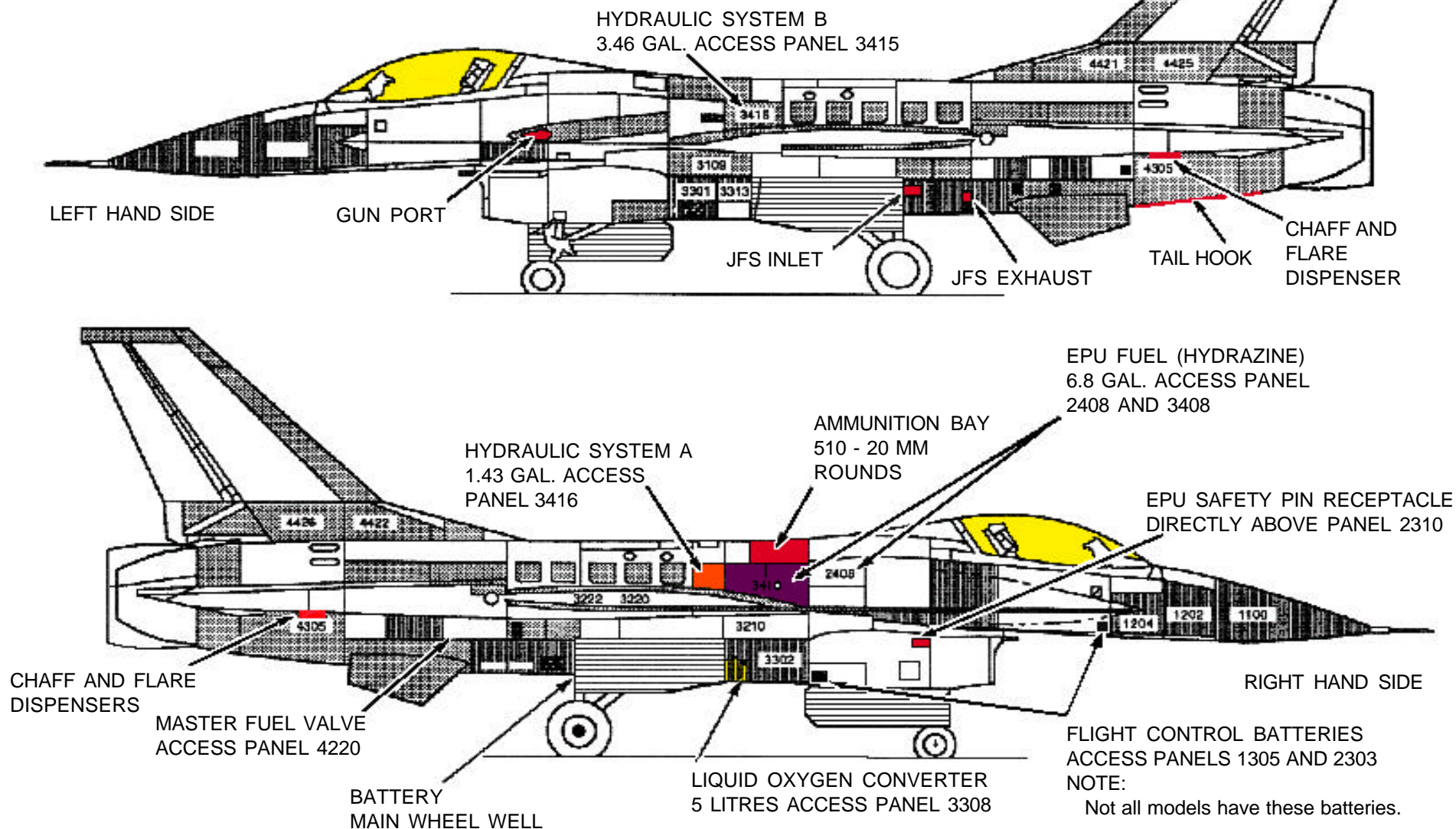
T.O. 00-105E-9

-  REMOVABLE STRUCTURAL COVERS (180) PANELS=6-62 MIN EACH
-  HINGED DOORS WITH QUICK ACTING STRUCTURAL FASTENERS (13) PANELS=3-6 MIN EACH
-  QUICK-ACCESS HINGED DOORS (6) PANELS=8-10 MIN EACH
-  LANDING GEAR DOORS (29) LESS THAN 1 MIN EACH



# AIRCRAFT HAZARDS AND ACCESS PANELS

- |   |  |
|---|--|
|  | REMOVABLE STRUCTURAL COVERS (180) PANELS=6-62 MIN EACH                       |
|  | HINGED DOORS WITH QUICK ACTING STRUCTURAL FASTENERS (13) PANELS=3-6 MIN EACH |
|  | QUICK-ACCESS HINGED DOORS (6) PANELS=8-10 MIN EACH                           |
|  | QUICK-ACCESS HINGED DOORS (29) LESS THAN 1 MIN EACH                          |
|   | LANDING GEAR DOORS   |



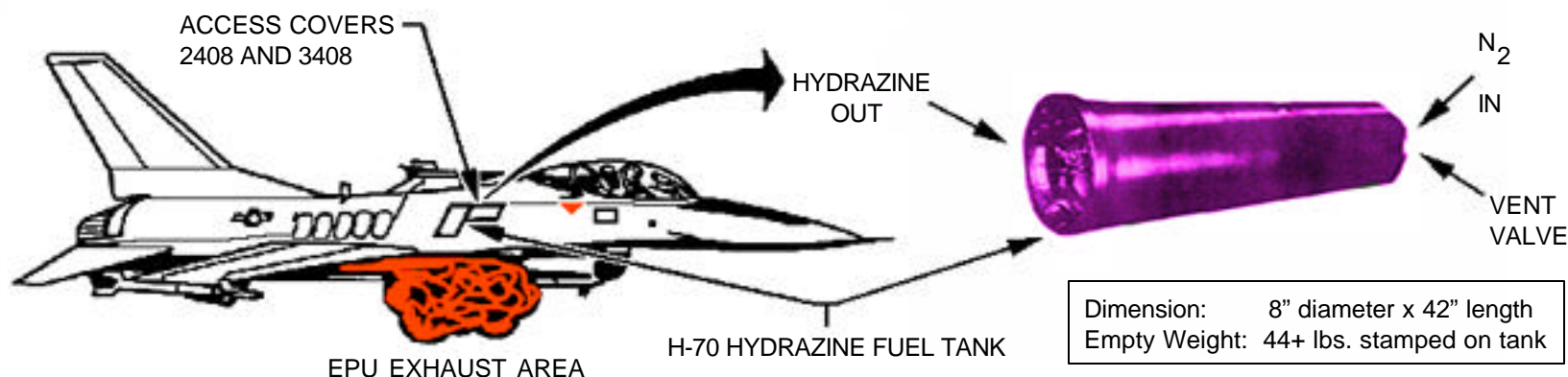
# EPU FUEL-H-70 HYDRAZINE HAZARD

## WARNING

AIRCRAFT CRASH OR EMERGENCY LANDING MAY RESULT IN HYDRAZINE SPILL OR VAPORS, RESCUE PERSONNEL WHO MAY BE EXPOSED SHALL WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE GARMENTS - FACE MASK AND PLASTIC OR RUBBER GLOVES AS A MINIMUM. SPILLED HYDRAZINE SHOULD BE DILUTED WITH EQUAL AMOUNTS OF WATER SPRAY TO RENDER NONFLAMMABLE.

## CAUTION

IF EPU IS OPERATING IN THE HYDRAZINE MODE, SELF - CONTAINED BREATHING APPARATUS SHOULD BE WORN BY RESCUE PERSONNEL IN THE IMMEDIATE VICINITY OF AIRCRAFT AND DURING EMERGENCY CANOPY ENTRANCE. THE AMMONIA CONSTITUENT OF EPU EXHAUST MAY CAUSE IRRITATION OF EYES, NOSE AND THROAT.



## GENERAL INFORMATION:

- F-16 Emergency Power Unit (EPU) Uses 70% Hydrazine and 30% Water Blend (H-70) as Fuel.
- Exhaust Gases from EPU Turbine are 40% Ammonia, 17% Nitrogen, 15% Hydrogen and 28% Water.
- EPU Operation Results in Noise Similar to a high pitched whine.
- Fire Hazards of Hydrazine are Similar to JP-4.
- Odor (Ammonia) Threshold is 2 to 3 ppm.
- OSHA Hydrazine Exposure Limit is 1.0 ppm Average Over an 8 Hour Period.
- ACGIH Hydrazine Exposure Limit is 0.1 ppm Average Over an 8 Hour Period; Excursion Up to 0.3 ppm are Permitted, Provided 0.1 ppm Average for 8 Hours is Not Exceeded.
- For additional information, refer to TO 1F-16A-2-49GS-00-1, Section IV, H-70 Fuel Spill Management and Neutralization and AFM 161-30, Chapter 9.



## WING FUEL TANKS

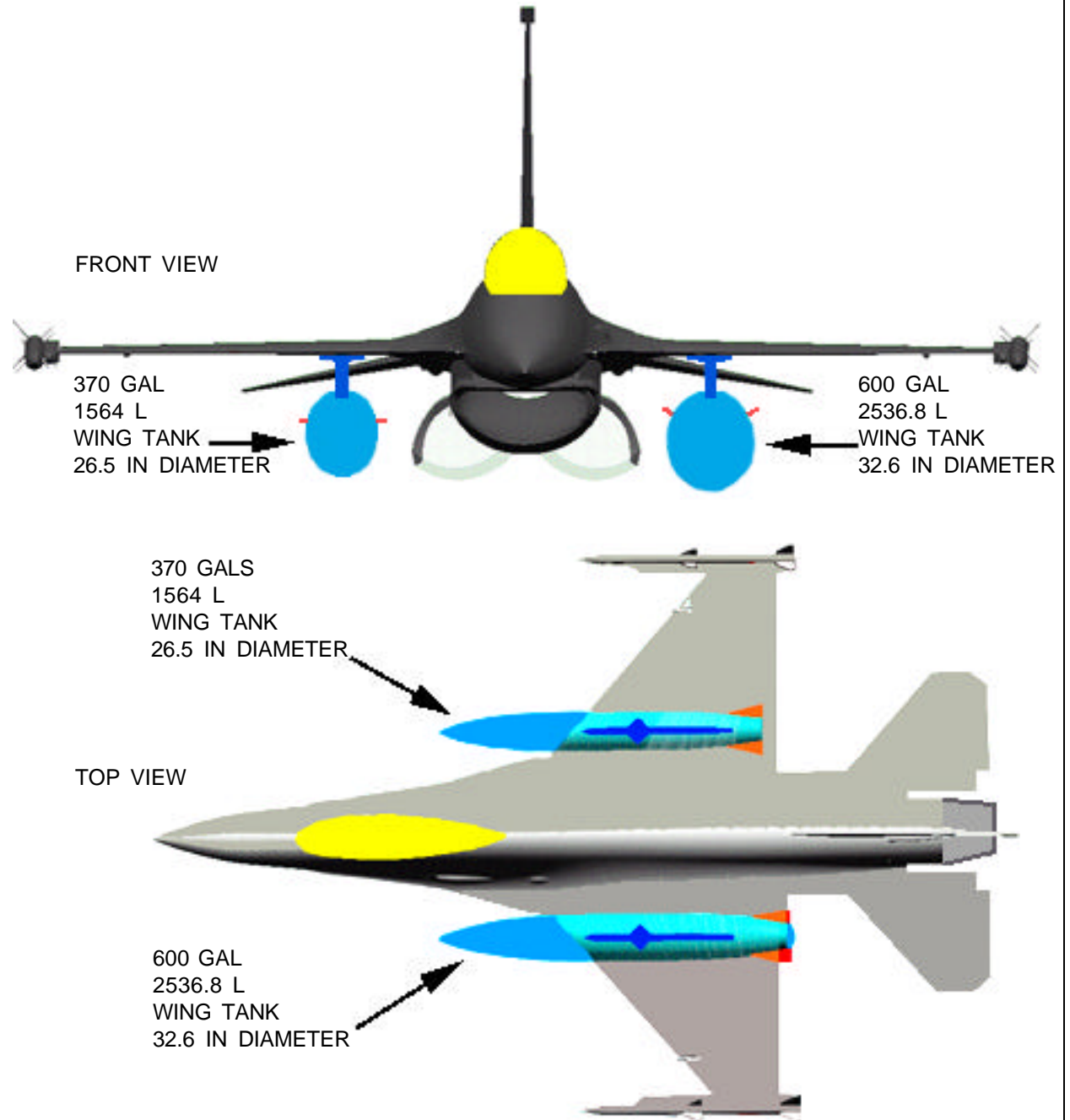
### NOTE:

Larger capacity wing tanks are being added to F-16 aircraft slated for foreign sales and a possible configuration for the USAF. These aircraft may be flown in the U.S. as well as abroad, therefore this information is required for rescue and response crews.

### 1. WING MOUNTED FUEL TANKS

### NOTE:

Each side can either carry the standard 370 gallon (1564 litres) or 600 gallon (2536.8 litres) under wing fuel tank.





## CONFORMAL FUEL TANKS

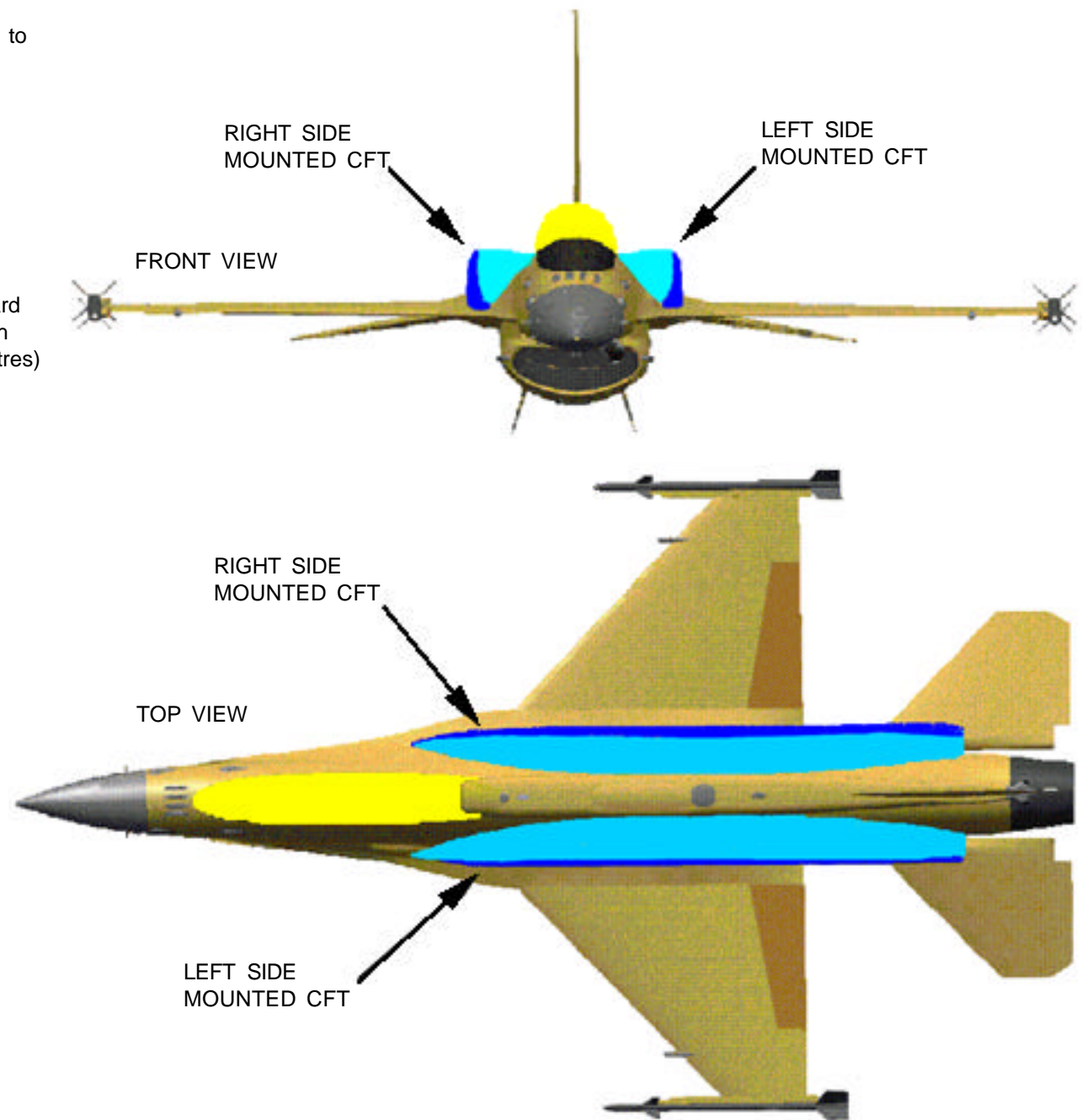
### NOTE:

Side mounted conformal tanks are being added to F-16 aircraft slated for foreign sales and a possible configuration for the USAF. These aircraft may be flown in the U.S. as well as abroad, therefore this information is required for rescue and response crews.

### 1. SIDE MOUNTED CONFORMAL FUEL TANKS

### NOTE:

Each upper fuselage side is made up of a forward and aft conformal fuel tank (CFT) section. Each side holds approximately 220 gallons (930.16 litres) or 1500 pounds. Total CFT fuel is 440 gallons (1860.32 litres) or 3000 pounds.



# AIRFRAME MATERIALS

## WARNING

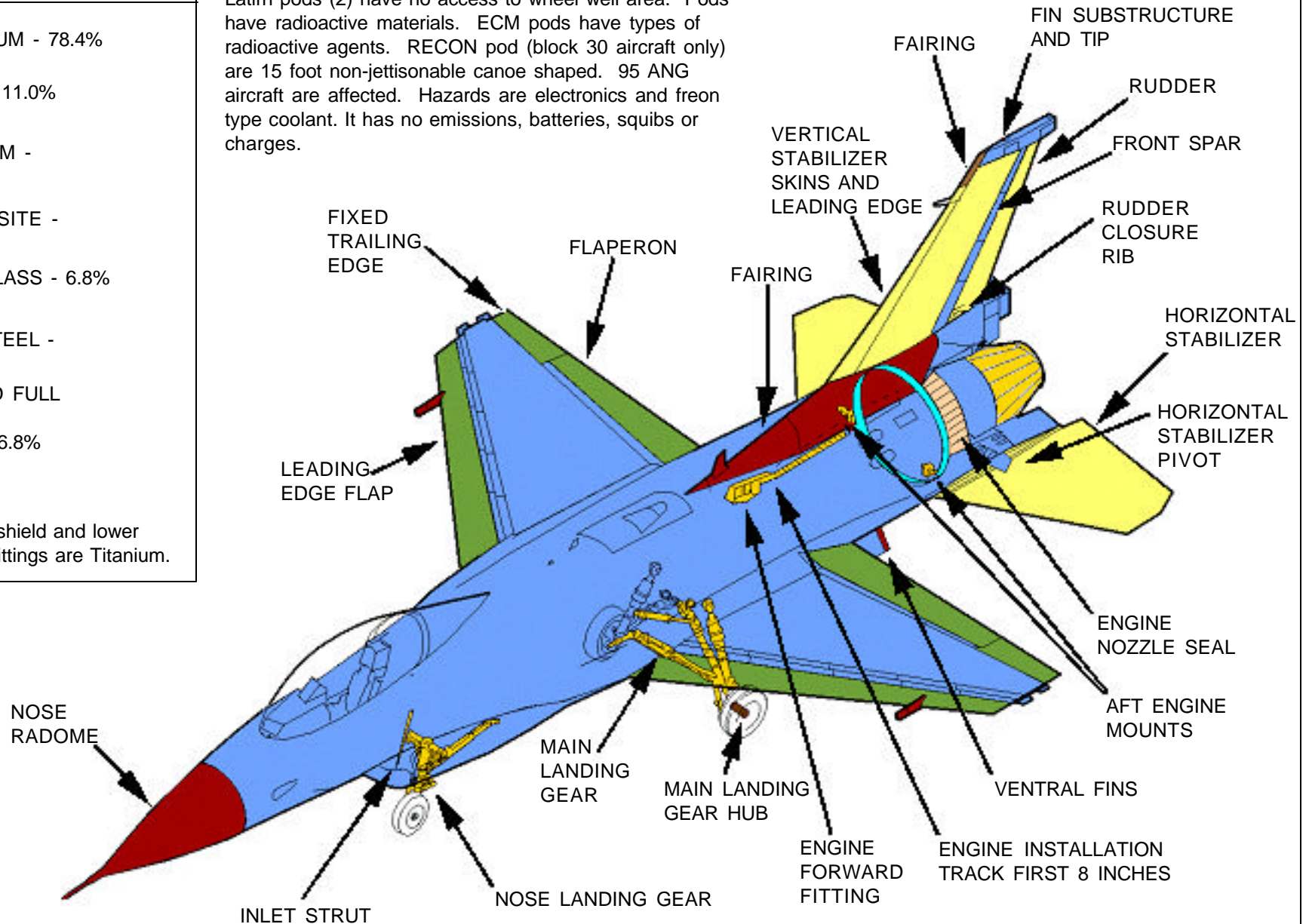
Latrim pods (2) have no access to wheel well area. Pods have radioactive materials. ECM pods have types of radioactive agents. RECON pod (block 30 aircraft only) are 15 foot non-jettisonable canoe shaped. 95 ANG aircraft are affected. Hazards are electronics and freon type coolant. It has no emissions, batteries, squibs or charges.

### LEGEND

- ALUMINUM - 78.4%
- STEEL - 11.0%
- TITANIUM - 0.8%
- COMPOSITE - 3.0%
- FIBERGLASS - 6.8%
- M300 STEEL - 6.8%
- BONDED FULL DEPTH CORE - 6.8%

### NOTE:

Engine heat shield and lower wing attach fittings are Titanium.



# AIRFRAME MATERIALS-Continued

## COMPOSITE WEIGHTS

### NOTE:

Use the legend on page F-16.7 for composites color coding.

Various type versions of the F-16 use 171-222 pounds of composite materials for the skins of the horizontal tails, vertical fin and rudder, as well as certain structure inside the vertical fin.

F-16A/B: Small Tail 171 1lbs

F-16A/B: Big Tail 222.6 lbs

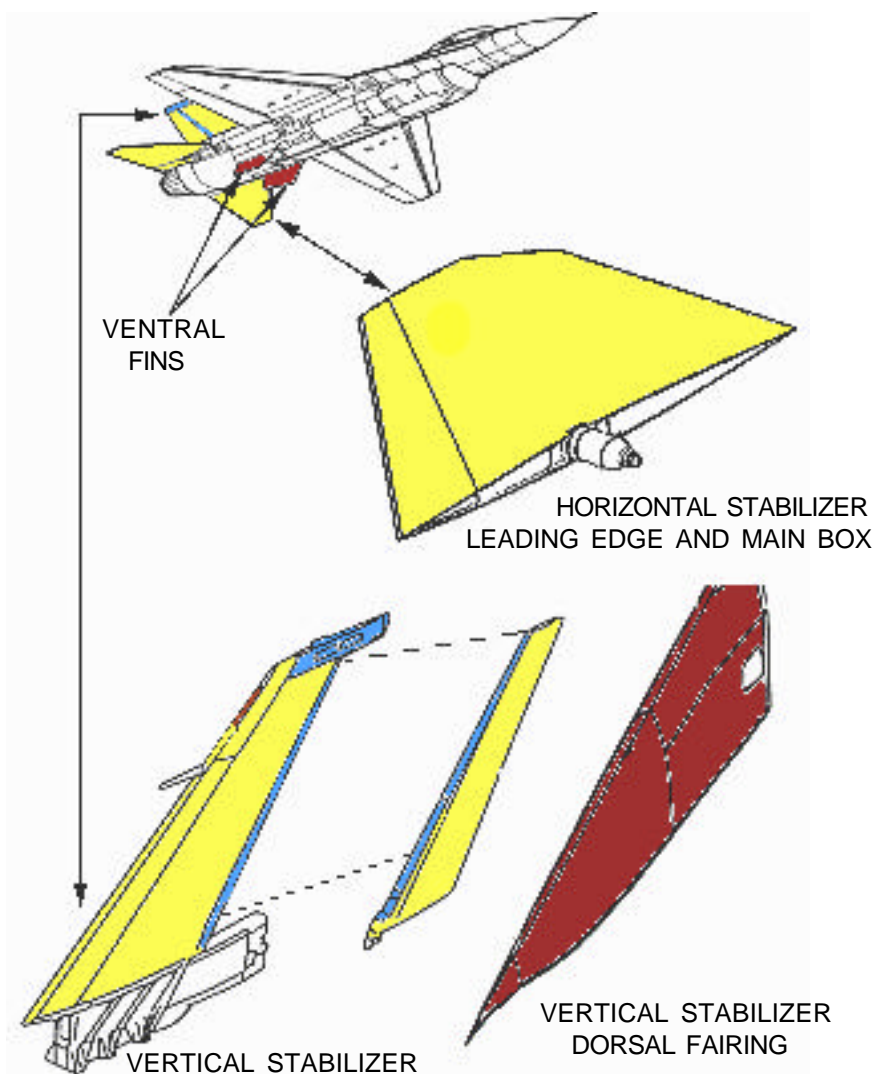
F-16C/D: 222.3 lbs

### F-16 C/D COMPOSITE MATERIALS LOCATION AND DESCRIPTION

Composite materials are in the ventral fins, vertical and horizontal stabilizers and radome. Because of redesigns, expect to find other miscellaneous aircraft parts made out of composite materials. The C/D ventral fin is a bonded assembly that incorporates a fiberglass epoxy sandwich laminate in the aft region. The core is an organic material. The horizontal stabilizer consists of two basic structures, the main box and the leading edge assembly. The main box is skinned with a carbon fiber epoxy laminate. The laminate's surface layer is a glass woven fabric. Underneath the fabric layer are layers of unidirectional carbon fiber/epoxy tape. Each tape layer has a specific fiber orientation. This will be obvious when looking at an impact-damaged piece. There may be woven fabrics dispersed among the tape layers. The laminate is bonded to a corrugated aluminum surface. There is a layer of fiberglass between the aluminum surface and the carbon fiber layer.

The leading edge is a sandwiched composite. The skin is a carbon fiber epoxy laminate bonded to an aluminum honeycomb core. A carbon fiber epoxy channel section is used as an aft closure beam bonded to the sandwiched laminate. A fiberglass wedge is used as a leading edge closure capped with stainless steel.

The radome is a glass/epoxy filament wound composite with a surface layer of a woven glass fabric. The F-16 radome fiber directions are longitudinal and circumferential. The fin box of the vertical tail is skinned with carbon fiber epoxy laminate. The lower fin leading edge is a carbon fiber/epoxy sandwich laminate. The rudder contains a carbon fiber / epoxy sandwich laminate. The core is an aluminum honeycomb material. The vertical tail dorsal fairing skin is fiberglass.



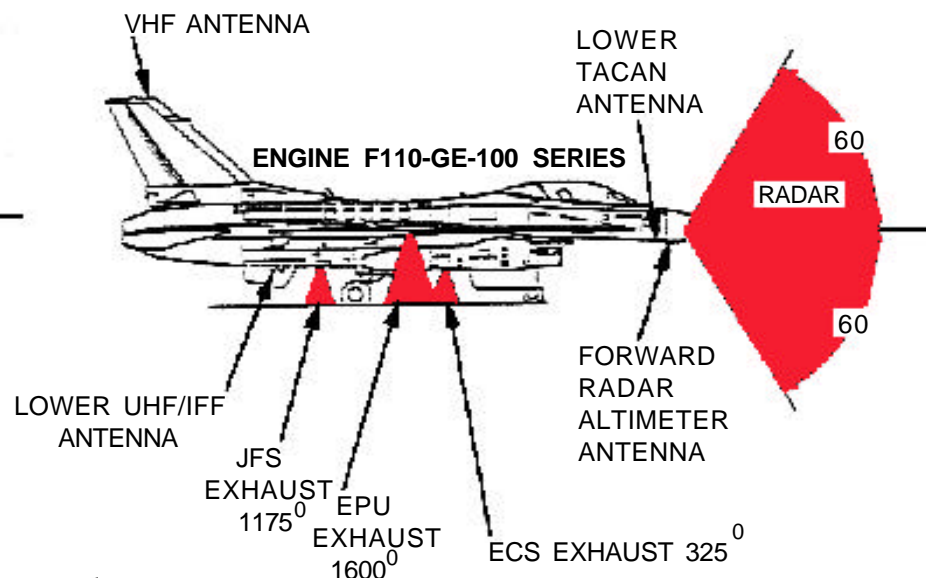
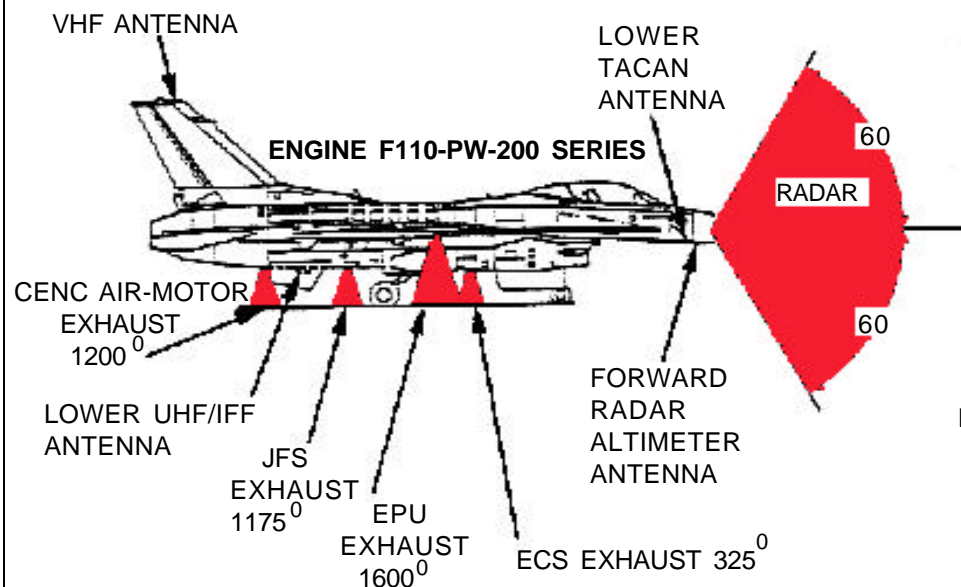
# AIRCRAFT DANGER AREAS

## RADIATION AND ANTENNAS

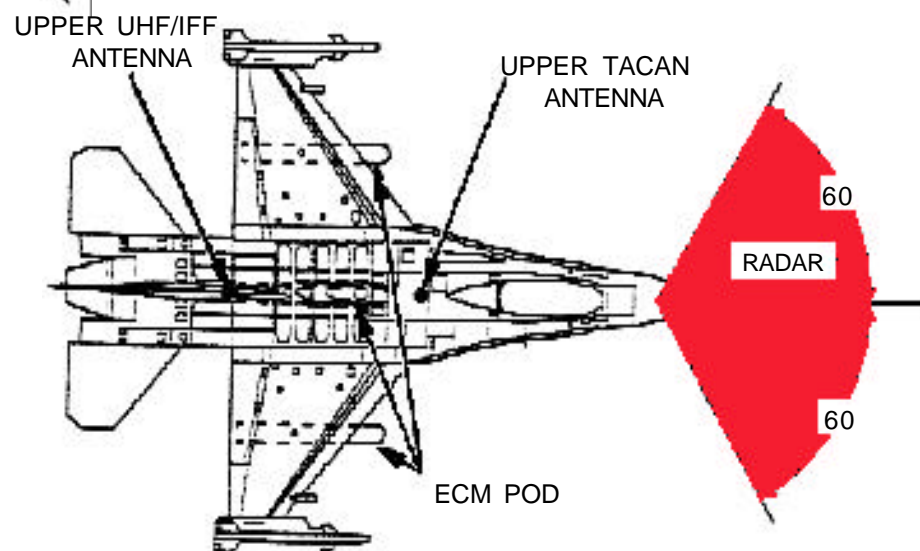
### NOTE:

- Distance from radar disc to forward tip of radome = 5 feet.
- ECM pods radiate in a fan pattern fore and aft.

F-16



COMMON TO BOTH ENGINES



OPERATING TRANSMITTERS	MINIMUM SAFE DISTANCE FROM ANTENNAS IN FEET		
	VOLATILE FLUIDS	PERSONNEL	EED
UPPER AND LOWER UHF/IFF	—	1	—
UPPER AND LOWER TACAN	—	1	—
VHF	—	1	—
RADAR ALTIMETER	—	1	—
FIRE CONTROL RADAR	30	120	120
AN/ALQ-119	—	6	6
AN/ALQ-131	—	15	15
AN/ALQ-176	—	6	6
AN/ALQ-184	—	31	6
AN/ALQ-188	—	6	6
QRC-80-01	—	6	6

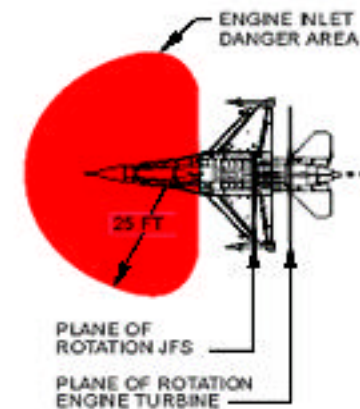


# F-16.10 AIRCRAFT DANGER AREAS-Continued

ENGINE THRUSTS FOR F110-GE-100/129/132

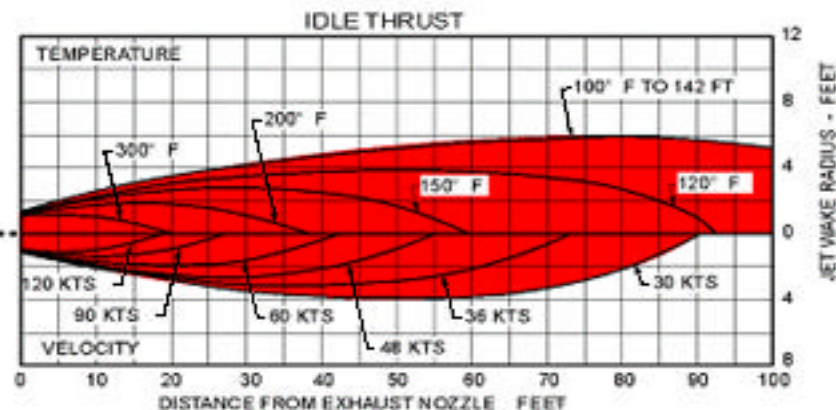
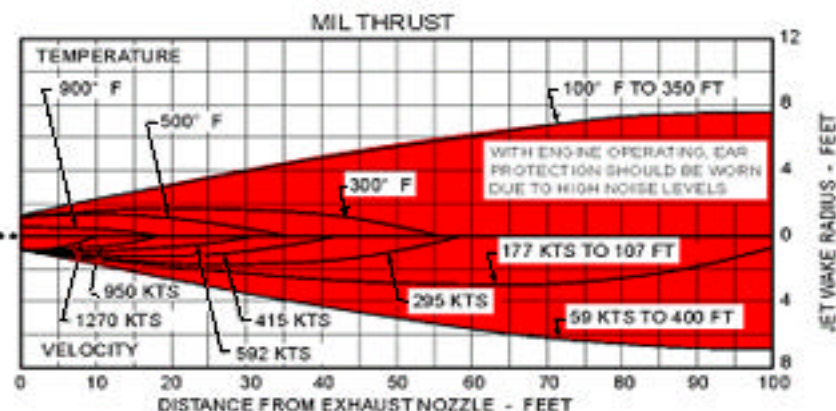
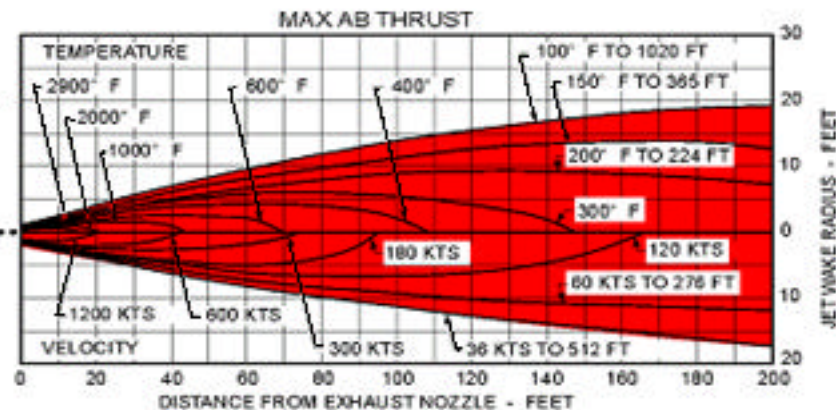
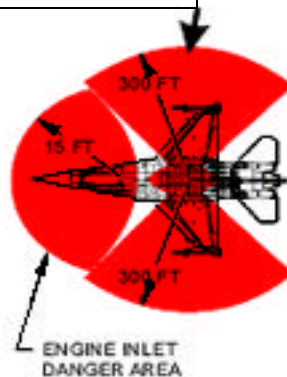
## CAUTION

The safe distance to maintain around engine intakes is 25 feet regardless of thrust.



## TIRES AND HOT BRAKES

Avoid inflated MLG tire side area within 300 feet for 45-60 minutes after aircraft has stopped. If required, approach from the front or rear only.



F-16

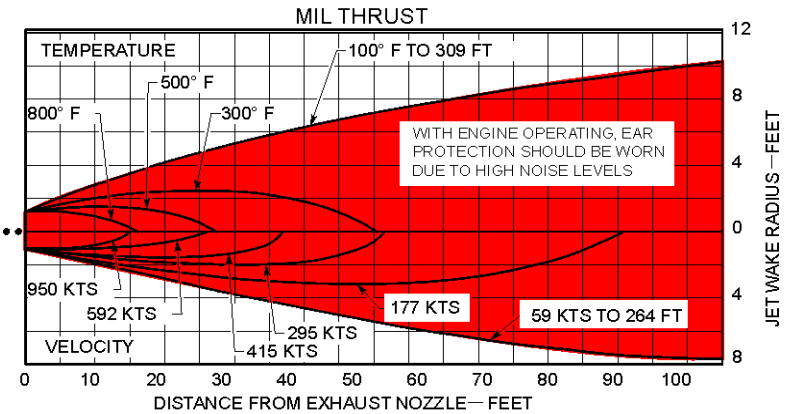
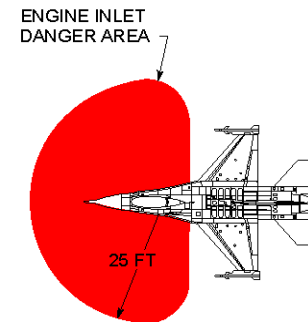
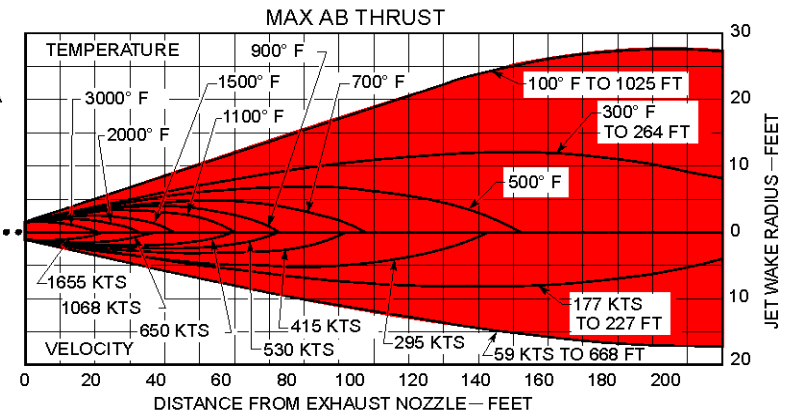
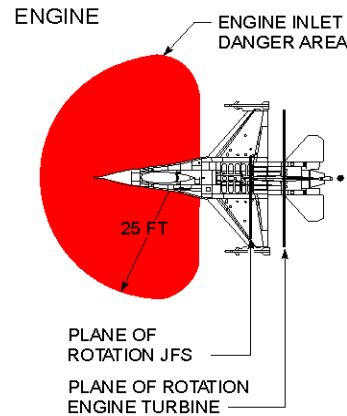
T.O. 00-105E-9

# F-16.11 AIRCRAFT DANGER AREAS-Continued

ENGINE THRUSTS FOR F110-PW-200/220/220E

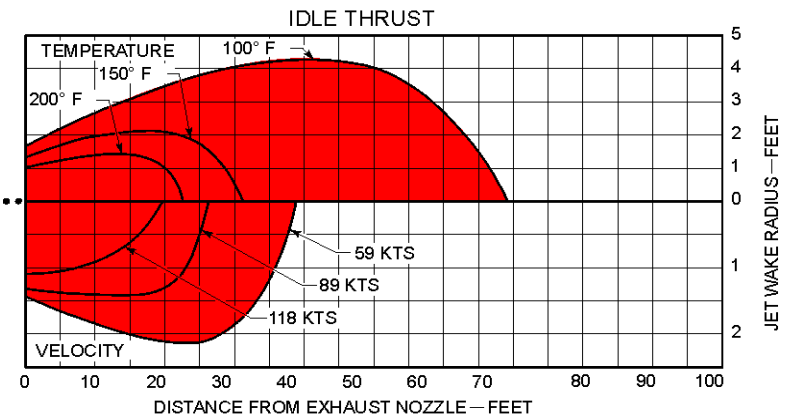
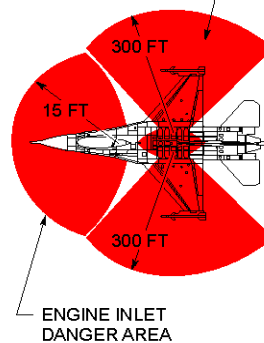
## CAUTION

The safe distance to maintain around engine intakes is 25 feet regardless of thrust.



## TIRES AND HOT BRAKES

Avoid inflated MLG tire side area within 300 feet for 45-60 minutes after aircraft has stopped. If required, approach from the front or rear only.



F-16

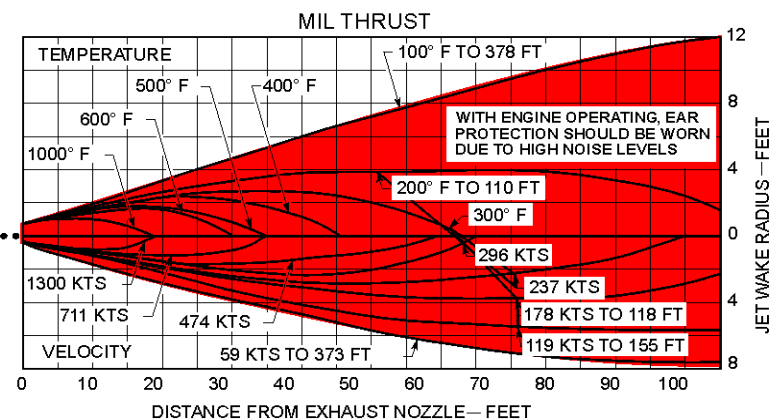
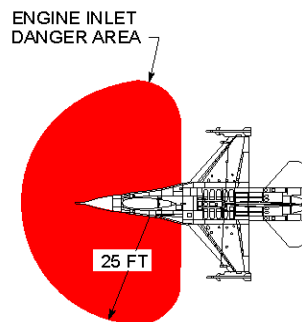
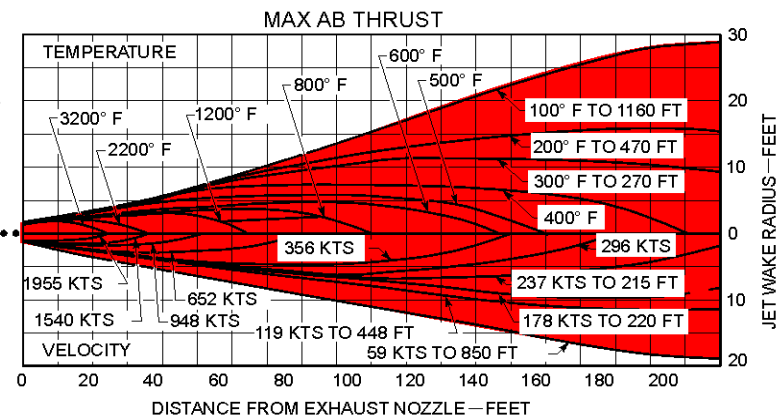
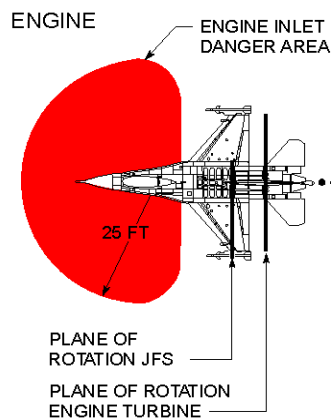
T.O. 00-105E-9

# F-16.12 AIRCRAFT DANGER AREAS-Continued

ENGINE THRUSTS FOR F110-PW-229

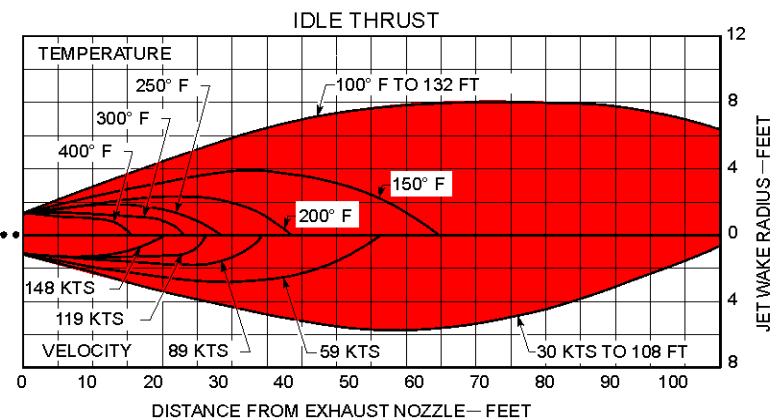
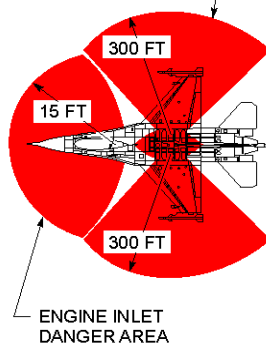
## CAUTION

The safe distance to maintain around engine intakes is 25 feet regardless of thrust.



## TIRES AND HOT BRAKES

Avoid inflated MLG tire side area within 300 feet for 45-60 minutes after aircraft has stopped. If required, approach from the front or rear only.



F-16

T.O. 00-105E-9

# SPECIAL TOOL

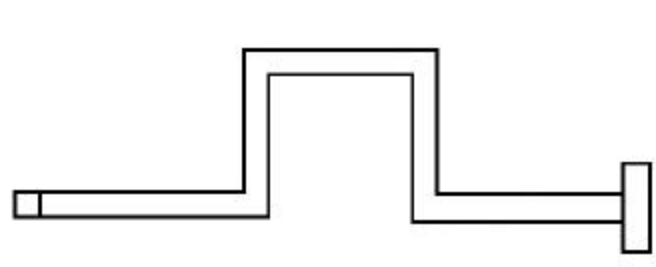
## LOCAL MANUFACTURED TOOL

### NOTE:

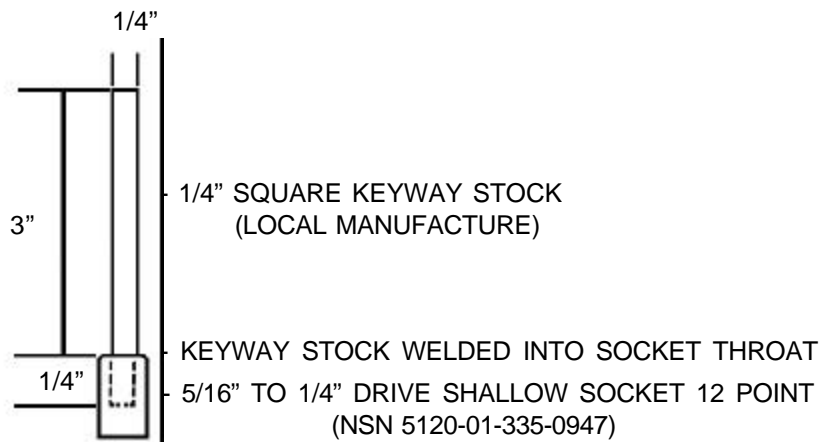
This tool can be locally manufactured with 1/4" keyway stock for the 1/4" plug removal on the left side fuselage. The 1/4" keystock will prevent wearing out the plug head and accelerate the rescue process. See page F-16.10 steps 2a and 3a for application. Attach this tool to a socket wrench or speed handle. A substitute tool for the socket wrench or speed handle can be a cordless drill.

### WARNING

DO NOT USE A POWERED DRILL TO OPEN THE CANOPY! The canopy mechanisms are not engineered for rapid opening and a malfunction can occur resulting in a possible falling canopy and failed rescue!



TYPICAL 1/4" DRIVE SPEED HANDLE FOR SPECIAL TOOL





## SPECIAL TOOLS/EQUIPMENT

Power Rescue Saw w/ Carbide Tipped Toothed Cutting Blade  
 Speed Handle -1/4 In. Drive Socket Drive  
 1/4 In. Drive Apex Holder w/ 9/64 Inch Apex  
 2 each Safety/Gun Pins P/N NAS1333C3C151D or Equivalent  
 0.149 to 0.125 Diameter Drill Rod at least 8 In.  
 Cordless Drill Fire Drill II Wire Cutters/Dikes

## AIRCRAFT ENTRY

**WARNING**

6.8 gallons of hydrazine fuel the EPU. **DO NOT PIN NOSE GEAR UNTIL ENGINE IS SHUTDOWN!**

## 1. GUN SAFETYING

- a. Install gun safety pin in receptacle underneath the left strake, aft of canopy external switch access door and outboard of exit door No. 3105.

**CAUTION**

Pin from outside only. DO NOT place hand inside gun safe compartment.

**WARNING****FOR AN ACTIVATED EPU**

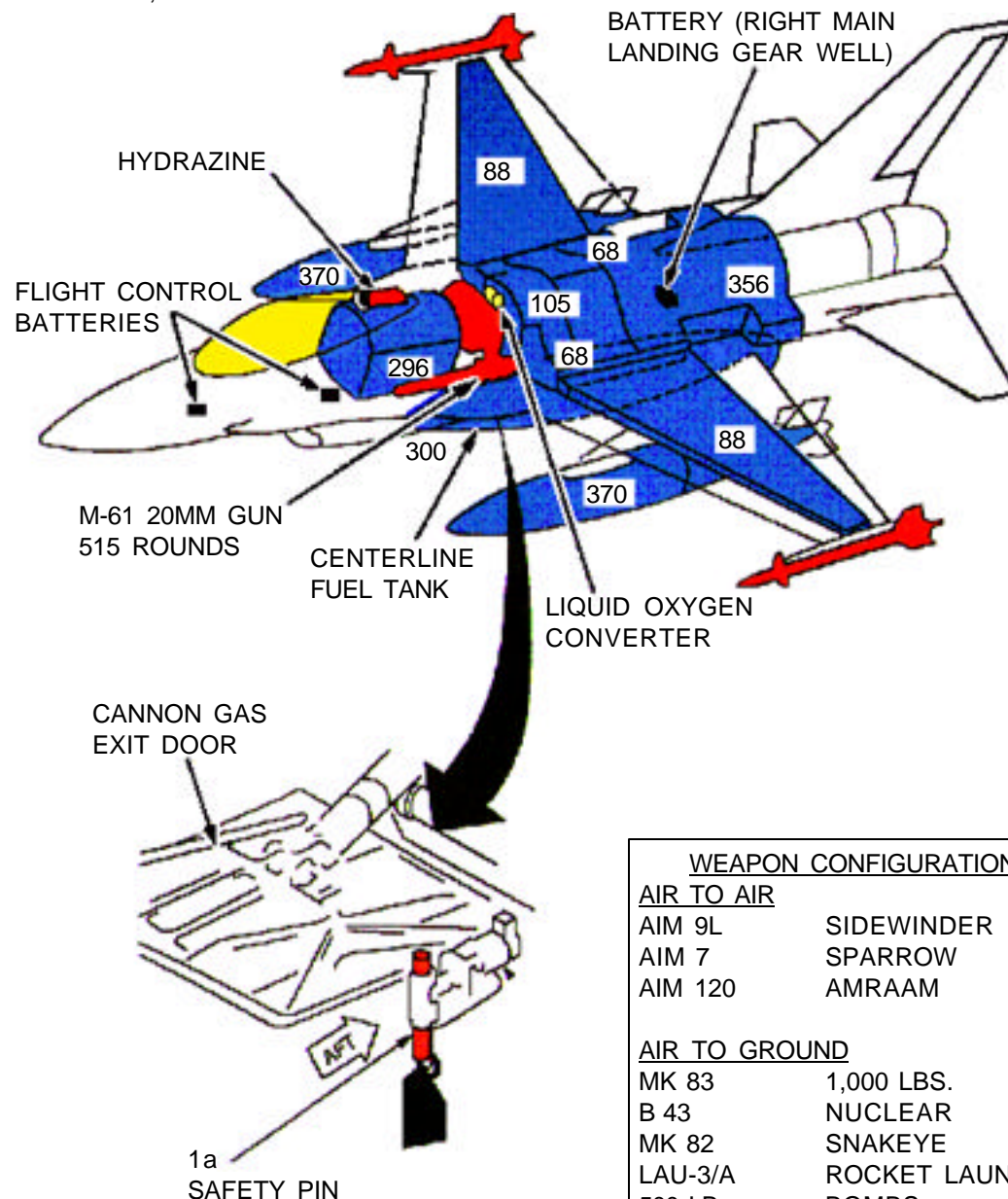
Unless required by technical order, personnel will not approach engine intake closer than five feet from either side or rear and maintain a distance of 25 feet from front intake when engine is running. **The EPU is no longer required to be safed until engine is shutdown.** Firefighters/rescue personnel are in imminent danger working near the engine intake. Disregarding this **WARNING** could result in **injury or death** to rescue personnel and possible engine F.O.D. with the EPU safety pin assembly.

## NOTE:

Entry procedures vary if engines are running, pilot is active or incapacitated, and condition of aircraft. Refer to appropriate procedures.

CONVENTIONAL ARMAMENT UP TO 2,000 LBS.

TOTAL FUEL 2,109 US GALS.

WEAPON CONFIGURATIONSAIR TO AIR

AIM 9L	SIDEWINDER
AIM 7	SPARROW
AIM 120	AMRAAM

AIR TO GROUND

MK 83	1,000 LBS.
B 43	NUCLEAR
MK 82	SNAKEYE
LAU-3/A	ROCKET LAUNCHER
500 LB	BOMBS
PAVEWAY LASER GUIDED BOMBS	
AGM-78	A.R.M.
AGM-65	MAVERICKS

# AIRCRAFT ENTRY-Continued

## 2. NORMAL ENTRY

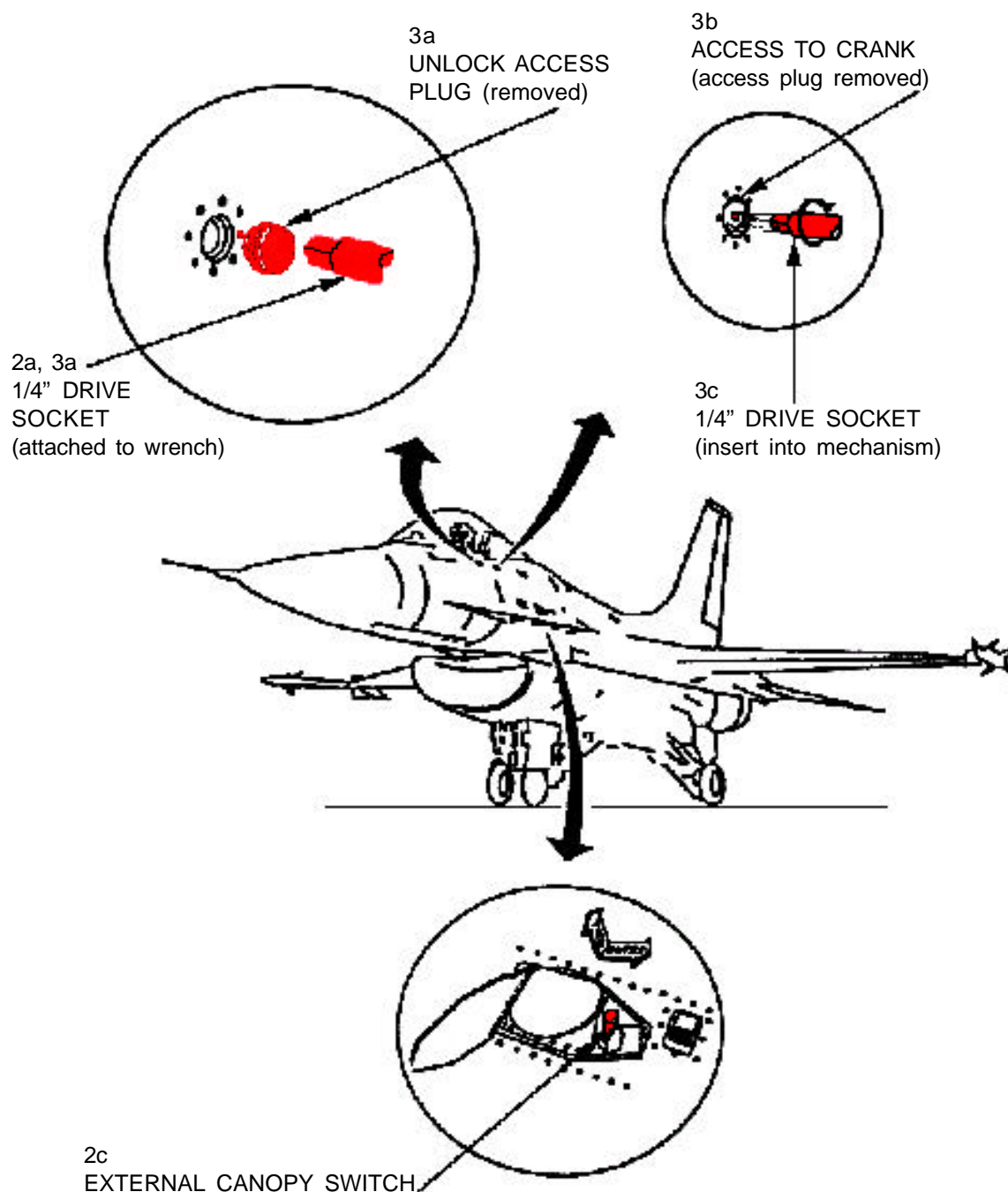
### NOTE:

If canopy is not locked from the inside, move the external canopy switch, located at left wing strake at door 2105, to the UP position to open canopy.

- Use a 1/4 inch dr. socket wrench or speed handle to remove unlock access plug, located left side of fuselage. Use cordless drill to remove plug if stripped.
- Insert at least a 0.149 to 0.125 inch diameter drill rod into crank insert opening and push inboard to unlock canopy.
- Access door 2105, depress thumb catch and move the external canopy switch to the UP position to open canopy.

## 3. MANUAL ENTRY

- Use a 1/4 inch dr. socket wrench or speed handle to remove unlock access plug, located left side of fuselage. Use cordless drill to remove plug if stripped.
- Insert at least a 1/8 inch diameter drill rod into opening and push inboard to unlock canopy.
- Insure that canopy unlock handle is raised to unlock position. Insert 1/4 inch dr. socket wrench or speed handle into crank insert opening mechanism located left side of fuselage aft of unlock access plug.
- Rotate canopy opening mechanism clockwise 52 revolutions to fully open a single seat F-16A/C canopy or 87 revolutions on a two seat F-16B/D.



# AIRCRAFT ENTRY-Continued

## 4. EMERGENCY ENTRY

### WARNING

- If the canopy is restrained by debris or jammed by crash damage, do not jettison the canopy. Attempted jettison may result in a portion of the canopy rocket exhaust entering the cockpit. This exhaust may expose the crewmembers to a toxic gas, heat, and blast hazard.
  - Flames, heat, and blast from the canopy jettison rocket exhaust nozzles will extend to the pavement and could ignite flammable fluids and vapors.
- a. Open canopy emergency release door, located on each side of fuselage below canopy. Only one canopy release door needs to be opened to jettison the canopy. Only one thumb latch per door is installed and only one thumb latch needs to be pushed.
  - b. Extend jettison handle to full length (approximately 6 feet) and pull to jettison canopy.

## 5. CUT-IN

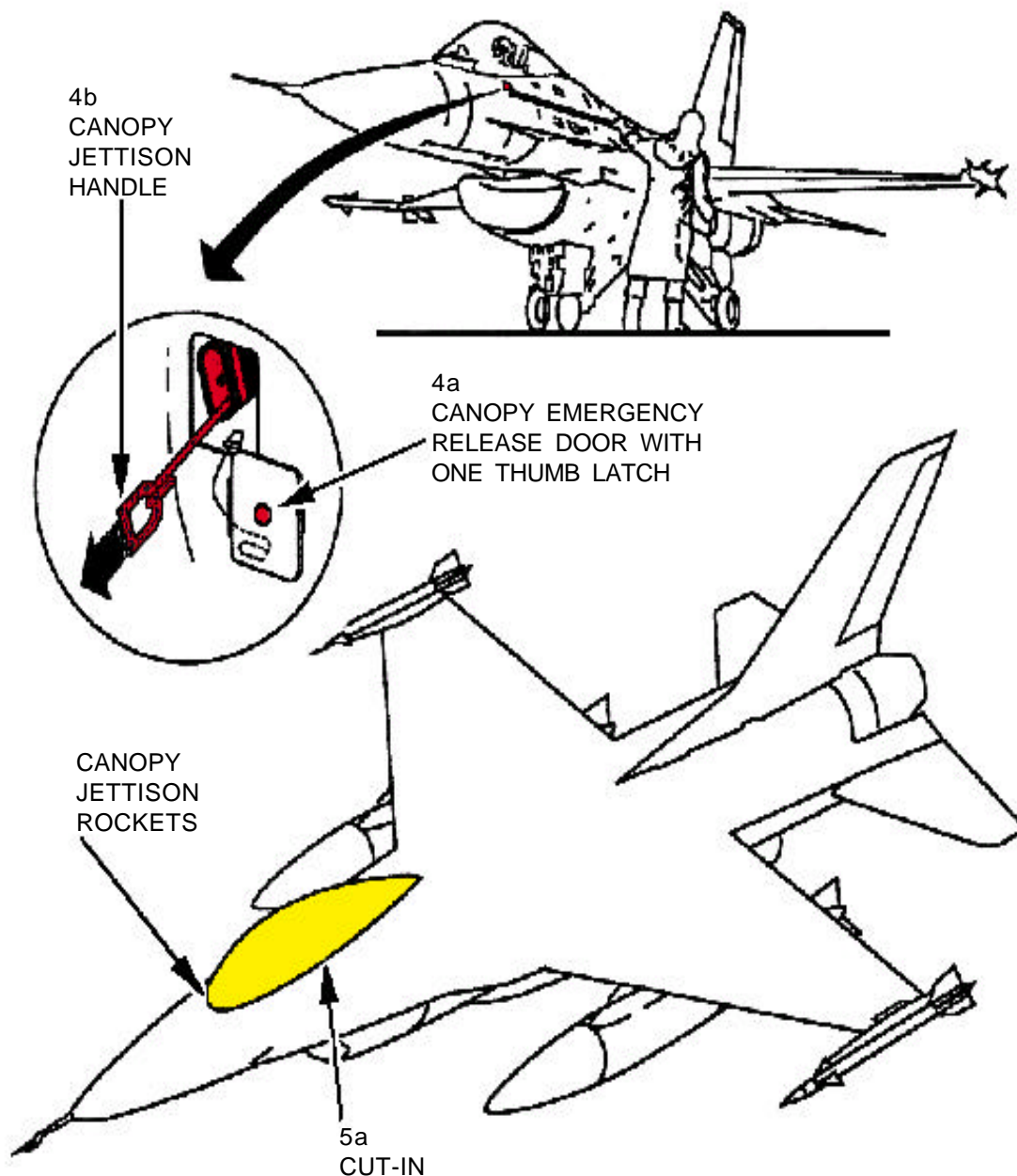
### NOTE:

Due to the strength of the canopy transparency, all sides of the canopy must be cut to reach the crewmember(s).

### WARNING

Extreme caution must be taken during the cutting operation to avoid hitting the canopy jettison rockets and other ballistic components mounted in or near the canopy frame.

- a. Cut through the canopy transparency using a power rescue saw with a carbide tipped, toothed cutting blade. On a F-16B/D, the aft seat transparency material is thinner and easier to cut.





# ENGINE SHUTDOWN

## 1. ENGINE SHUTDOWN WITH ACTIVATED EPU-PILOT ACTIVE

### CAUTION

Unless weight is on wheels, the EPU will start up when the engine is shutdown.  
Chock left main landing gear, but beware of hazards around a running aircraft.

#### NOTE:

**Pilot action** is required for the following steps. If pilot is incapacitated, or ejected, go to page F-16.18.

- Confirm EPU switch is in the OFF position.
- Confirm the throttle is in the OFF position.
- Confirm main power/battery switch is in OFF position.
- After engine has stopped, pin the EPU ground safety switch.

#### NOTE:

If conditions make installation of the EPU safety pin impossible or impractical, disconnecting the battery in right main wheel well will prevent startup of EPU.

- If the engine fails to shutdown, gain access to the MFSOV (Master Fuel Shut Off Valve), located under panel 4220 at the right wing root below the flap hinge.
- Depress the thumb releases on panel 4220 and lower panel for access to MFSOV.
- Disconnect or manually cut cannon plug from MFSOV to remove electrical power.

#### NOTE:

**Failure to remove electrical power will not allow shutdown using the MFSOV lever.**

- Cut safety wire located on MFSOV lever.
- Push and maintain forward pressure on MFSOV lever. Shutdown will occur 30 to 90 seconds.

#### NOTE:

At high RPM, holding lever may prove difficult. The degree of closure may be sufficient to reduce RPMs allowing cockpit access to the fuel master switch.

- Install EPU safety pin in EPU pin receptacle located on lower right inlet skin just above access panel 2310, approximately 3.5 feet aft of engine inlet lip.

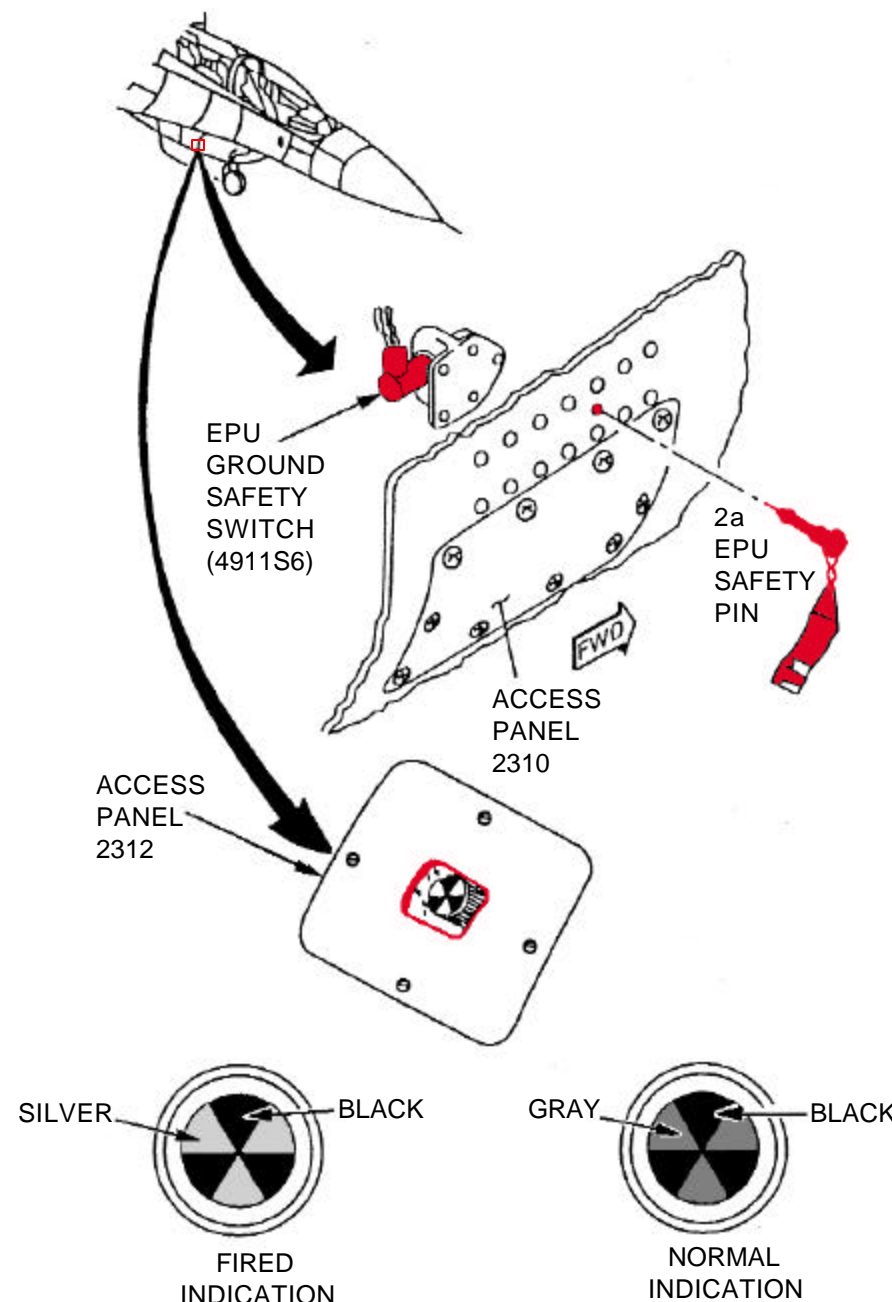
#### NOTE:

If EPU activates, during procedure, reduced electrical and hydraulic demands will permit hydrazine quantity to support approximately 15 minutes of EPU operation.

#### NOTE:

Without weight-on wheels, battery power can only be removed by disconnecting the electrical connections from the battery.

- Disconnect battery, located in right main wheel well, if accessible.





# EMERGENCY ENGINE SHUTDOWN

## 2. EMERGENCY ENGINE SHUTDOWN WITH UNMANNED COCKPIT OR PILOT INCAPACITATED OR EJECTED SEAT(S)

### NOTE:

Recent F-16 incidents have warranted an overhaul of existing procedures. The following procedures are a result of air accident investigation board findings and recommendations.

### WARNING

When the EPU is operating, hydraulic and electric power will be available to move flight control surfaces. Review existing danger areas on pages F-16.9 - F-16.12 to prevent injury or death to personnel working under extreme emergency conditions.

- a. Gain access to the MFSOV, located under panel 4220 at the right wing root below the flap hinge.

### NOTE:

If panel 4220 is not accessible, perform applicable Aircraft Entry or Emergency Entry procedures on pages F-16.15 and F-16.16 and then proceed to step f (next page).

- b. Depress the thumb releases on panel 4220 and lower panel for access to MFSOV or use an allen head for the tridair fastener.
- c. Disconnect or manually cut cannon plug from MFSOV to remove electrical power.

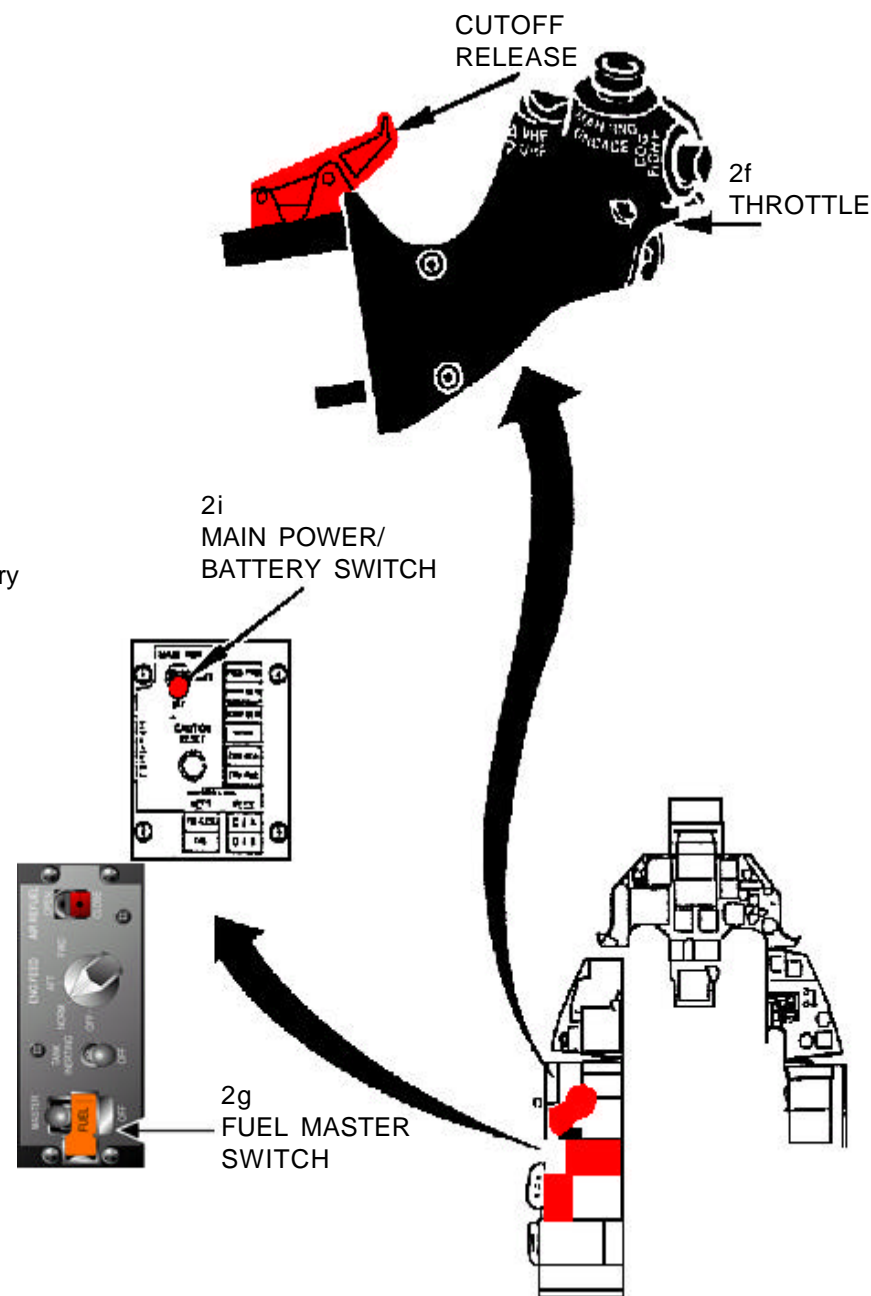
### NOTE:

**Failure to remove electrical power will not allow shutdown using the MFSOV lever.**

- d. Check for and cut safety wire, located on MFSOV lever, if installed.
- e. Push inboard, maintain forward pressure on MFSOV lever and hold. Shutdown will occur 30 to 90 seconds. Shutdown time depends on engine type and power setting. Proceed to step f on page F-16.19.

### NOTE:

- At high RPM, holding lever may prove difficult. The degree of closure may be sufficient to reduce RPMs allowing cockpit access to the fuel master switch.
- If engine shutdown procedures are unsuccessful, perform applicable Aircraft Entry or Emergency Entry procedures on pages F-16.15 and F-16.16 and then proceed to step f (next page).
- Throttle of F-16 two seat models cannot be positioned to OFF in rear cockpit.



# EMERGENCY ENGINE SHUTDOWN-Continued

## 2. EMERGENCY ENGINE SHUTDOWN WITH UNMANNED COCKPIT OR PILOT INCAPACITATED OR EJECTED SEAT(S) - Continued

- f. Move throttle, located on aft left console (fwd cockpit only on F-16 two seat models) while tilting handle upward/outboard and squeezing throttle cutoff release trigger to proceed from IDLE to OFF position.

### NOTE:

F-16 two seat models have a functional fuel master switch in rear cockpit.

- g. If the engine fails to shutdown, place fuel master switch, located on fuel control panel directly aft of the throttle to OFF position.

### NOTE:

Some F-16s may have the MFSOV safety wired open. Safety wire on the MFSOV must be cut and removed to allow the MFSOV to close electrically when the fuel master switch is placed in the OFF position.

### NOTE:

F-16B/D also has a functional fuel master switch, located on the fuel control panel just aft of the throttle.

- h. If conditions permit and adequate personnel protective gear is available, insert an EPU safety pin into the EPU safety pin receptacle, located on the lower right inlet skin, just above panel 2310, approximately 3 1/2 feet aft of the engine inlet lip.

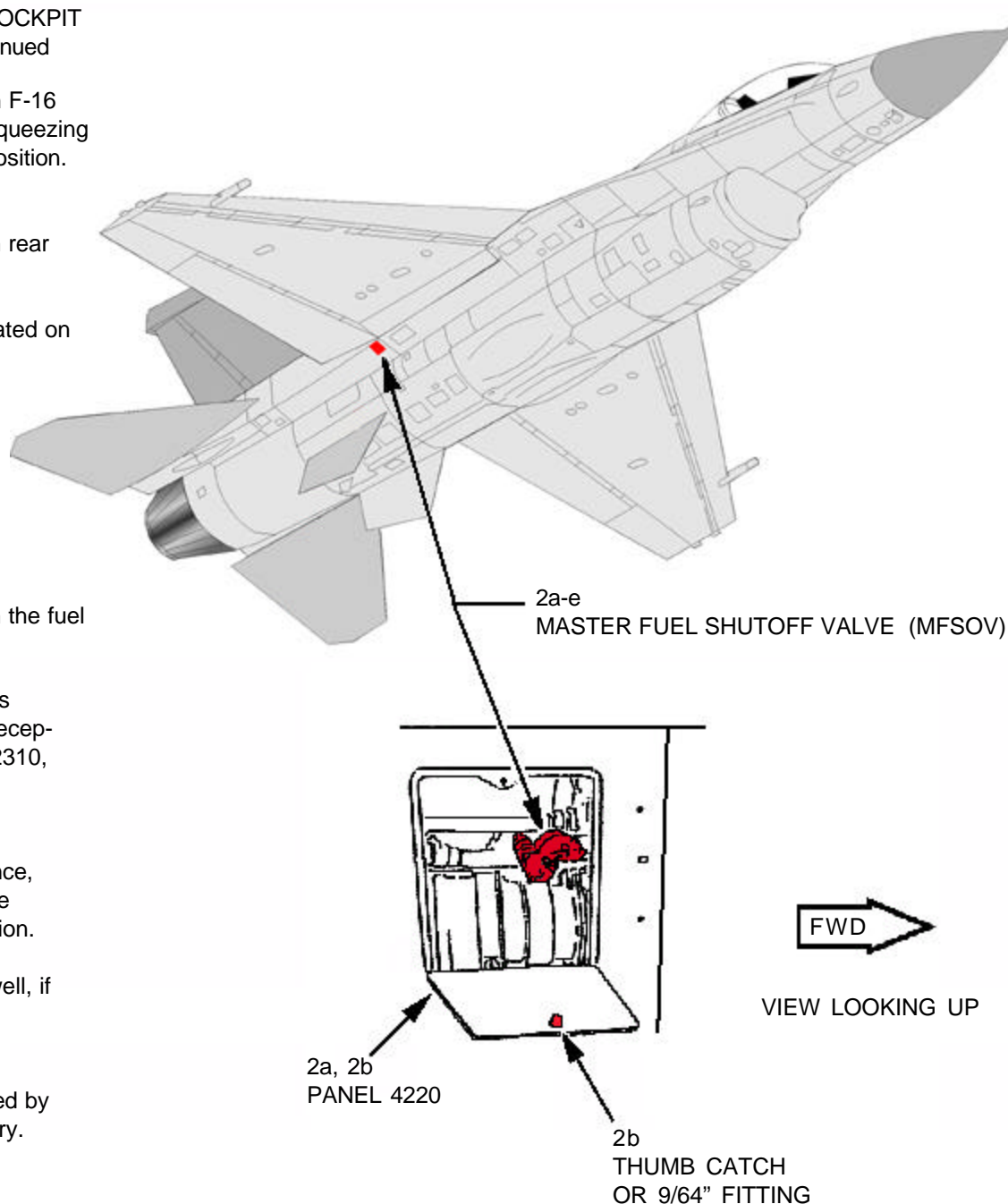
### NOTE:

If the EPU fires during the emergency ground rescue sequence, reduced electric and hydraulic demands will permit hydrazine quantity to support approximately 15 minutes of EPU operation.

- i. Disconnect aircraft battery, located in the right main wheel well, if accessible.

### NOTE:

Without weight on wheels, battery power can only be removed by disconnecting the single electrical connection from the battery.

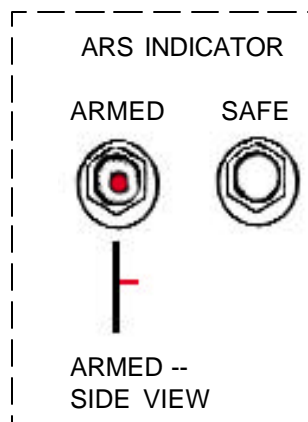


# EJECTION SEAT INDICATOR

## 1. EJECTION SEAT INDICATOR

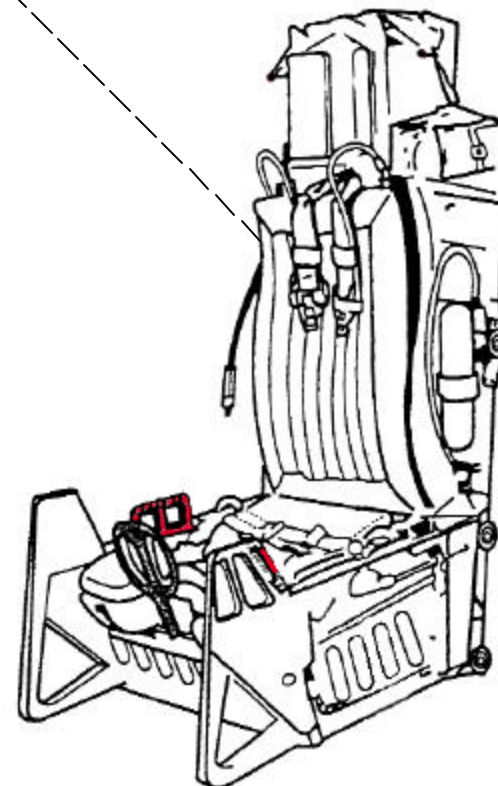
### WARNING

A Seat Armed Indicator located on the upper right side of the seat can indicate WHITE for OK and RED for SEAT ARMED. This indicates that the Advanced Recovery Sequencer (ARS) battery condition is serviceable or expended. If expended, the white sealant will be punctured by a protruding red pin. If this is a recent condition, it will take two hours for the seat to be considered safe to work around or remove. Electrical battery power is required to energize the recovery sequencer circuits for the numerous explosives on the seat. Use extreme caution and judgement in this case. If time permits, call the local Egress Shop before proceeding. If emergency exists and time does not allow inspection by the Egress Shop, sever all exposed ballistic lines including top of seat for the rocket catapult.



### NOTE:

Do not touch indicator sealant when checking condition. Frequent touching wears off sealant exposing tip of red pin indicating a false ARMED ARS condition.



# SAFETYING EJECTION SEAT

## WARNING

The seat is armed regardless of canopy position. Jettisoning the aircraft canopy automatically arms the ACES II ejection seat. Seat(s) can eject whether canopy is opened or closed. On two seat aircraft, both seats must be safetied before either can be considered safe. Extreme caution must be used not to inadvertently move the Ground Safety Lever from the SAFE position during aircrew extraction. **DO NOT USE PITOTS FOR HANDHOLD DURING ANY OF THE OPERATION.**

### 1. NORMAL SAFETYING EJECTION SEAT

#### NOTE:

The Ground Safety Lever Safety Pin can be installed regardless of seat position.

- a. Rotate Ground Safety Lever, located on left side of seat, UP and FORWARD, and install safety pin in pin receptacle at base of lever near pivot point. Pin faces forward. If safety pin can not be installed, tape or tie Ground Safety Lever in UP position to prevent arming during extraction.
- b. Install Safety Pin in the Emergency Manual Chute Handle. If Ground Safety Pin and Emergency Manual Chute Handle Pin are connected by one safety streamer, route Emergency Manual Chute Handle under aircrew's legs, otherwise extraction will cause entanglement with streamer.

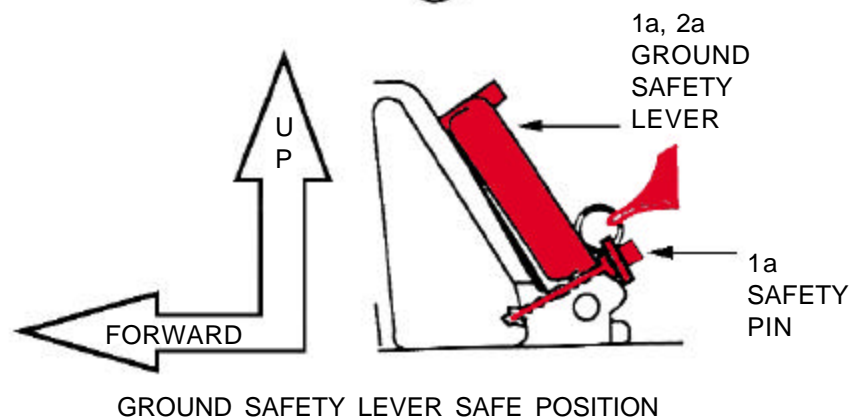
### 2. EMERGENCY SAFETYING EJECTION SEAT

- a. Rotate Ground Safety Lever, located on left side of seat, UP and FORWARD.
- b. Insure Ground Safety Lever does not rotate downward and arm seat during extraction or movement of aircrew.

EMERGENCY MANUAL  
CHUTE HANDLE

PITOT  
TUBES

1b  
SAFETY PIN





# AIRCREW EXTRACTION

## 3. AIRCREW EXTRACTION

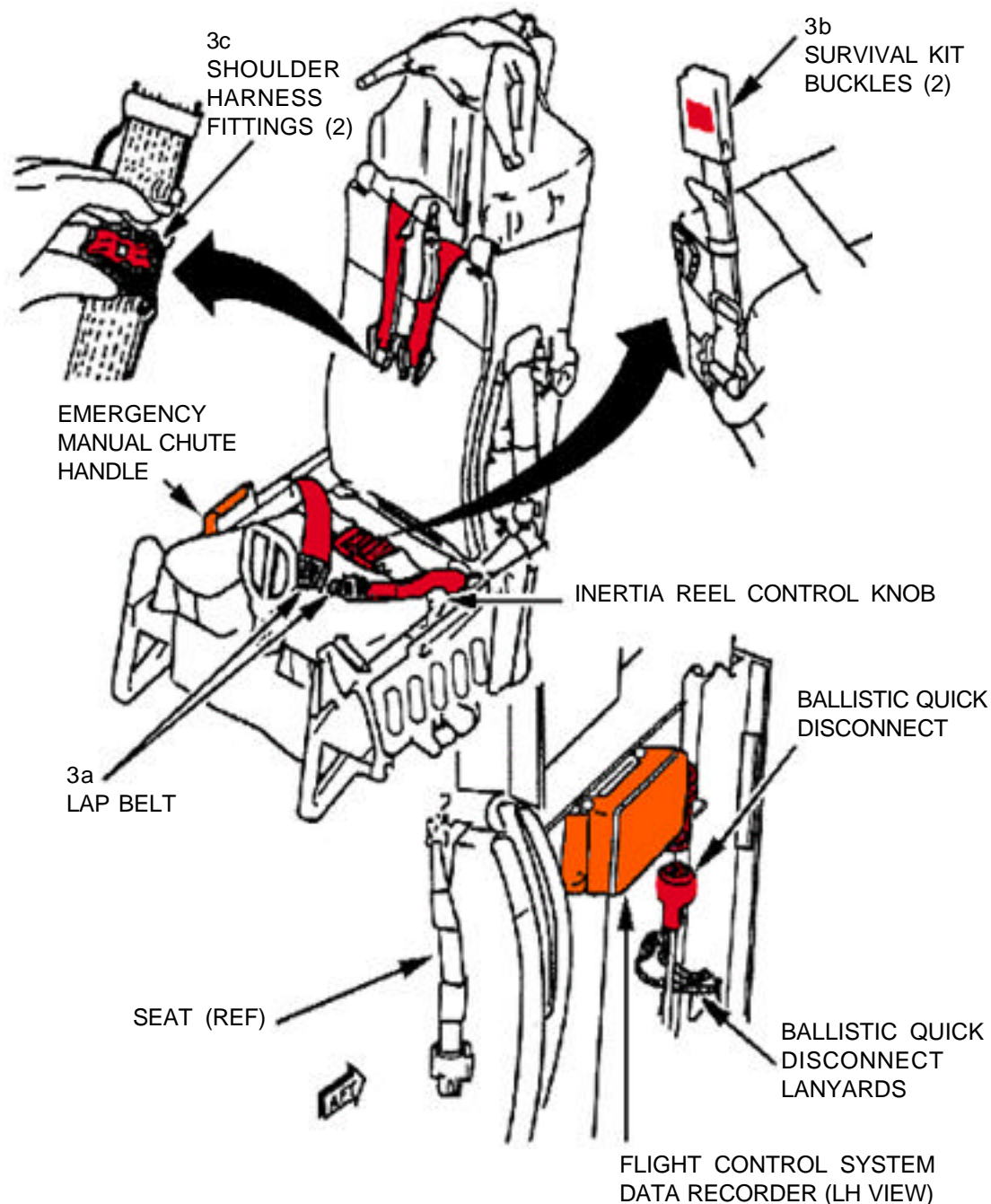
### NOTE:

Use of Emergency Manual Chute Handle **DOES NOT** release aircrew restraints.

- Release lap belt by squeezing latch and release bar simultaneously.
- Release left and right survival kit buckles by depressing PUSH TO RELEASE button on each buckle.
- Release left and right shoulder harness fittings by squeezing latch and release bar simultaneously for each fitting. (See pg F-16.23 for additional information.)

### NOTE:

- If the aircraft has collapsed landing gear or is in a gear up configuration and if time permits after rescue is complete, disconnect the electrical harness from the Flight Data Recorder, located on the left upper portion of the seat (front seat only on F-16B aircraft.) Grasp the lanyards attached to the connector and pull sharply downward. This will preserve recorded data of the mishap.
- The "G" suit hose located to the left side of the seat is directional in its separation at the disconnect. Pull straight down with a 12 to 70 pound pull force. If an offset direction is taken to disconnect hose from aircrew member, disconnect will not occur.



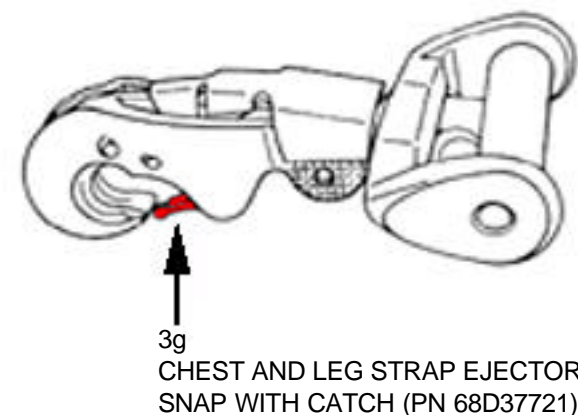
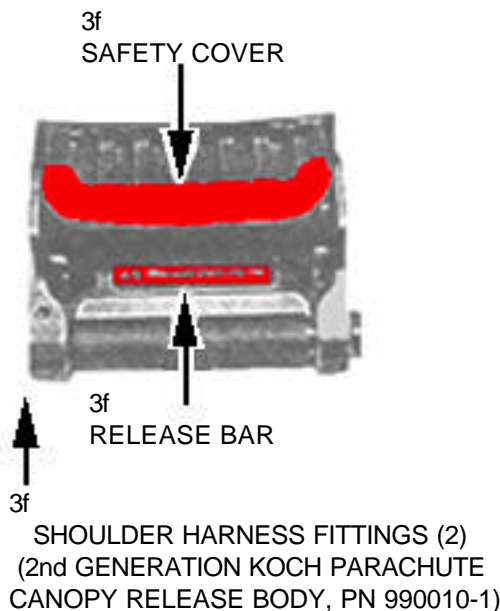
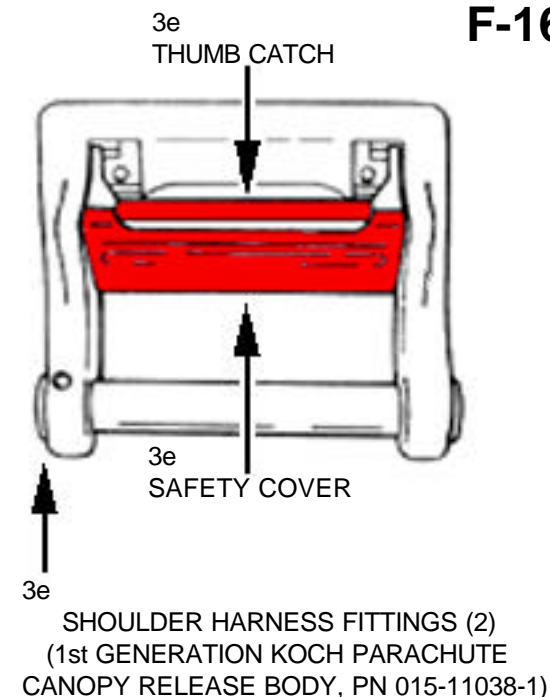
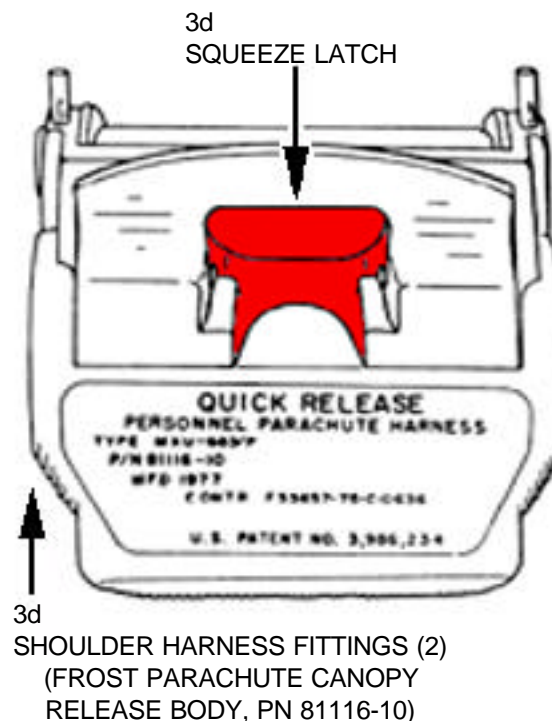
# AIRCREW EXTRACTION-Continued

## 3. AIRCREW EXTRACTION - Continued

### NOTE:

The shoulder harness fittings encountered may be different than the fitting mentioned on page F-16.22. Fittings may be a First or Second generation Koch or a Frost.

- d. Release left and right Frost shoulder harness fittings by squeezing latch and release bar simultaneously for each fitting as depicted on page F-16.22.
- e. Release left and right First Generation Koch shoulder harness fittings by rotating and holding safety cover downward, then pushing thumb catch upward to release straps.
- f. Release left and right Second Generation Koch shoulder harness fittings by lifting the safety cover, access the release bar, then rotate release bar downward to release straps.
- g. The chest and leg strap ejector snap is released by pushing the small catch of the ejector snap hook inward to release straps.





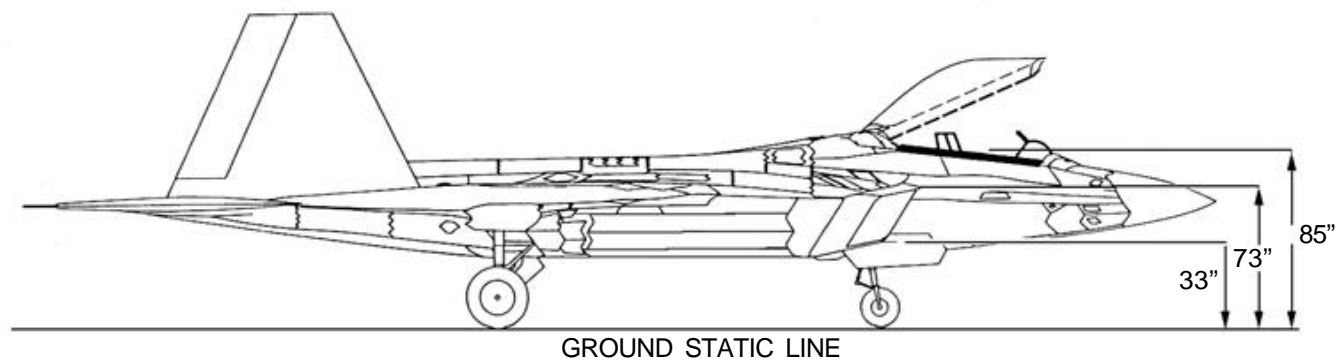
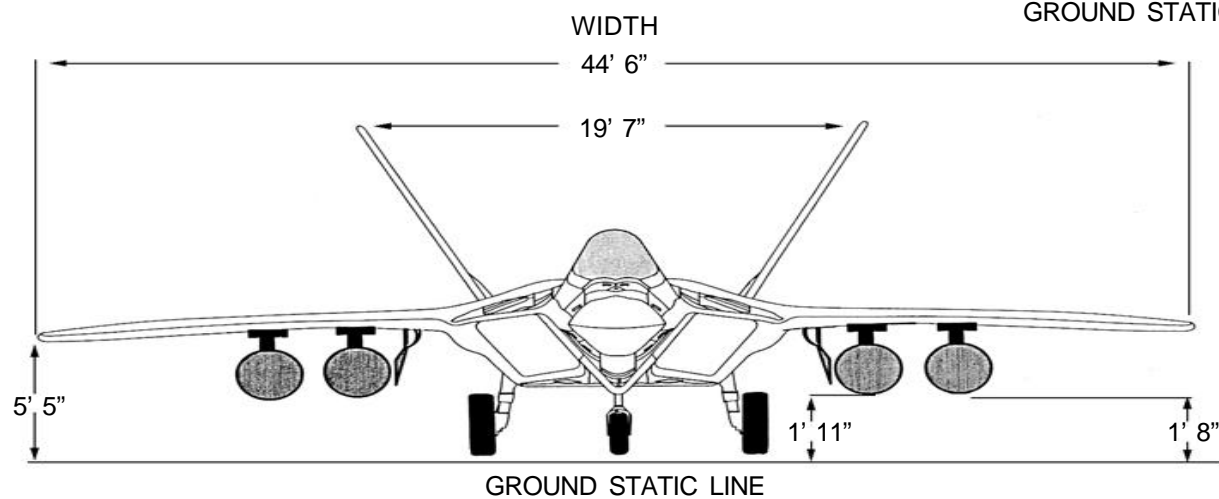
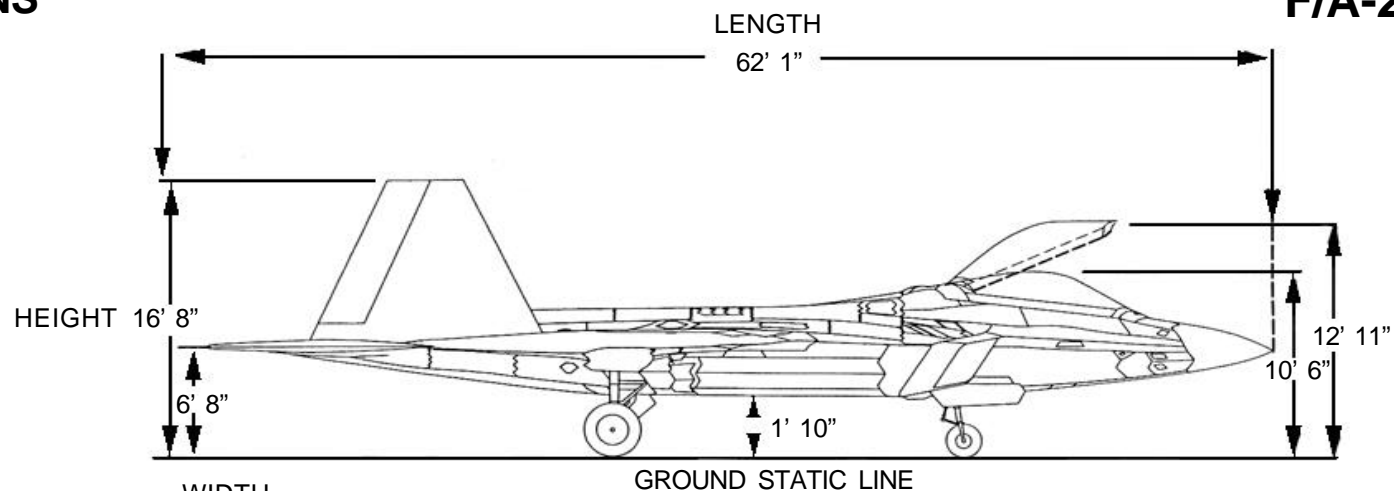
## AIRCRAFT PAINT SCHEME

F/A-22A



## AIRCRAFT DIMENSIONS

F/A-22A





# AIRCRAFT HAZARDS

## INLET, EXHAUST AND RADAR HAZARDS

### WARNING

Personnel should use extreme caution when approaching the inlet area and always proceed as if the engines were operating. Maintain a safe zone perpendicular to and forward of the inlets instead of determining a 45 degree arc. Failure to maintain or be aware of the 25 foot arc could cause injury or death to personnel. Loose clothing and no hat zone extends to 200 feet.

### WARNING

Personnel should use extreme caution when approaching the exhaust area which encompasses an arc of 250 feet aft of the engine nozzles.

### WARNING

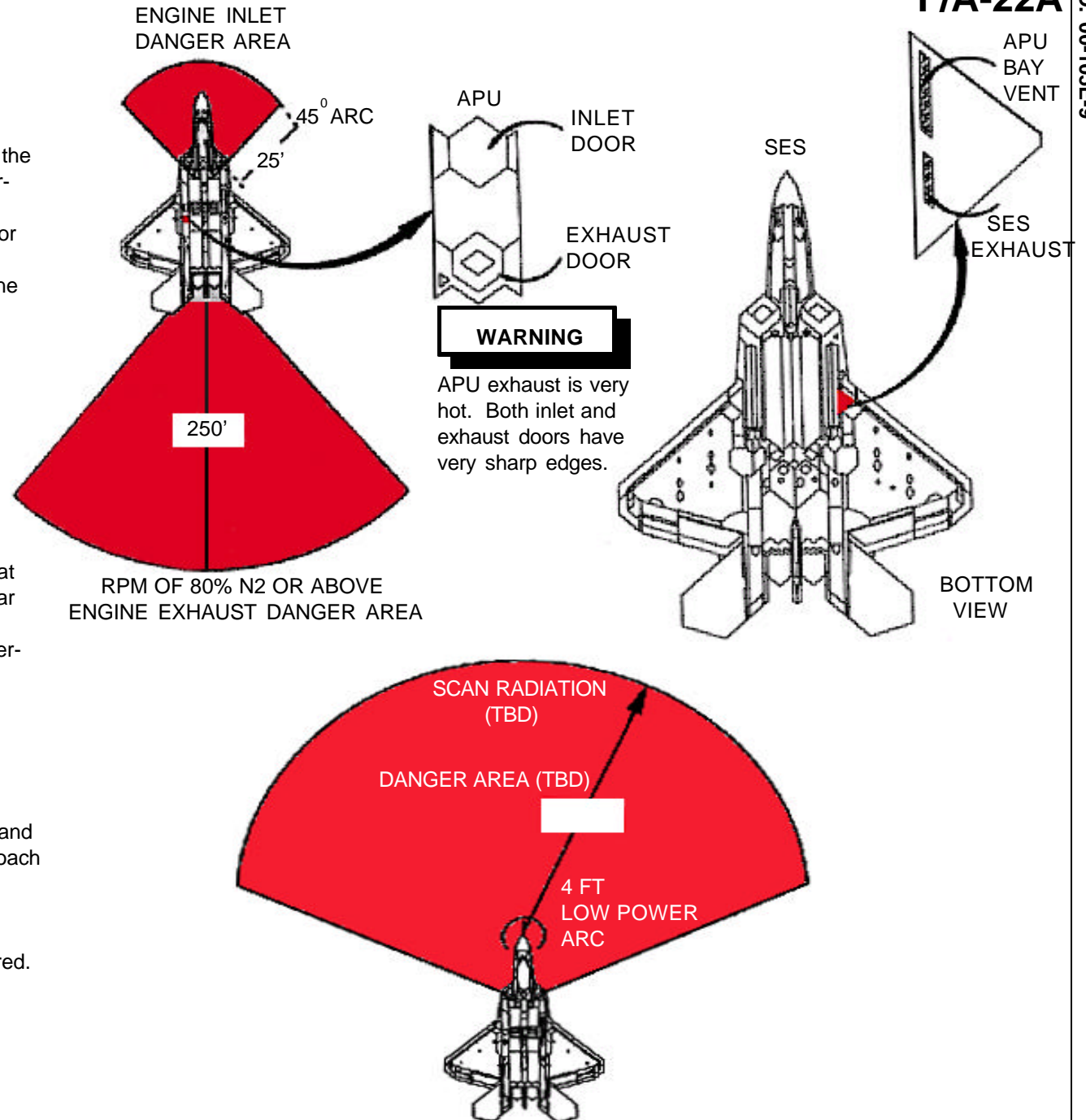
SES (Stored Energy System) exhaust is located at the left lower wing root above the main landing gear doors. This exhaust is extremely hot during APU starts or when the SES is activated during an emergency.

### WARNING

Low power radar emissions may be encountered during an emergency. The danger area for these emissions is a 4 foot arc. The actual high power and scan radiation area has not been determined. Approach with extreme caution as if the radar is operating.

### NOTE:

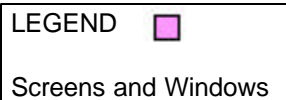
ECM emissions are not expected to be encountered.



# AIRCRAFT HAZARDS-Continued

F/A-22A

Bottom View for Screens and Windows

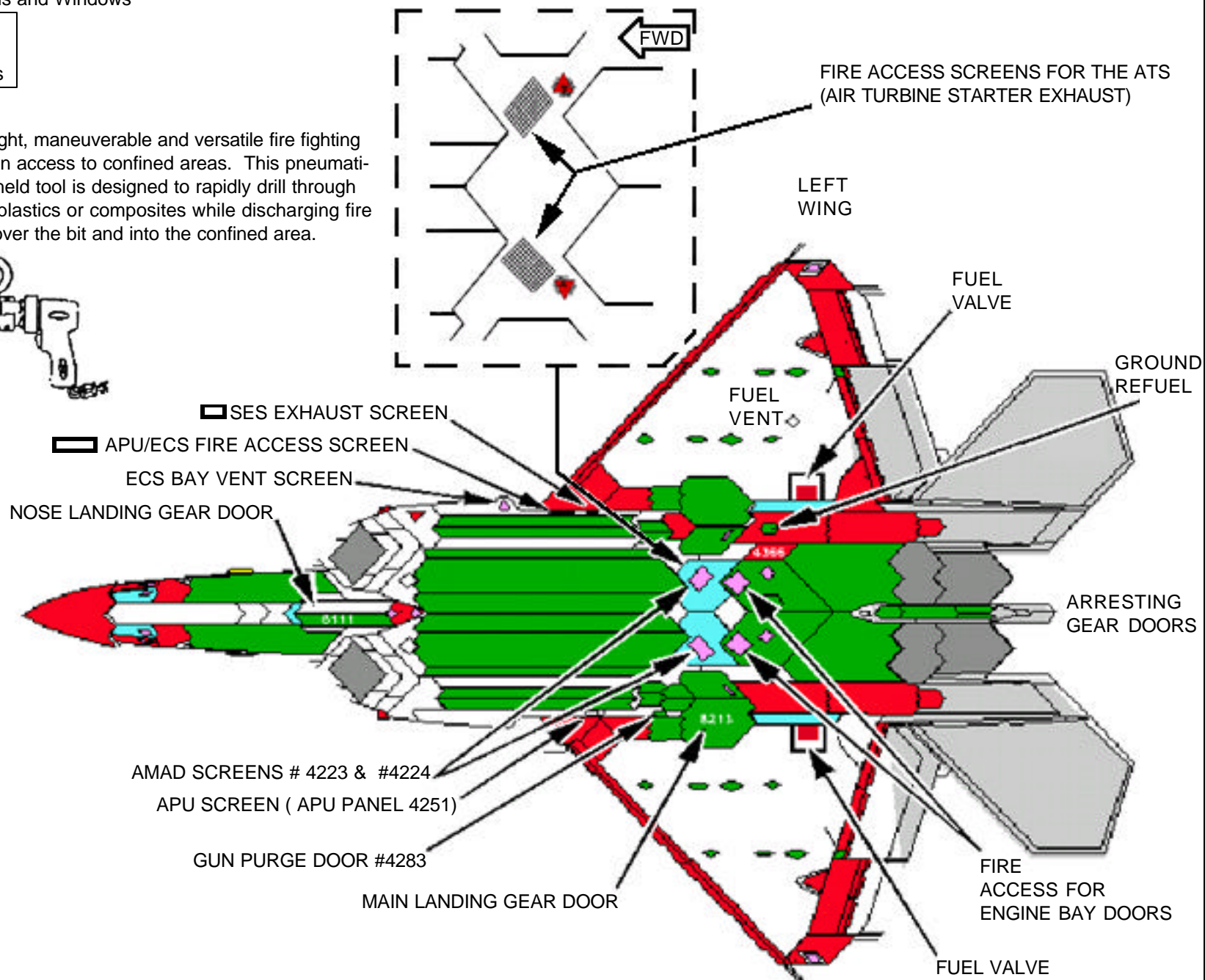


## NOTE:

The Fire Drill II is a light, maneuverable and versatile fire fighting tool developed to gain access to confined areas. This pneumatically powered hand held tool is designed to rapidly drill through aluminum, titanium, plastics or composites while discharging fire extinguishing agent over the bit and into the confined area.



FIRE DRILL 2



# AIRCRAFT HAZARDS-Continued

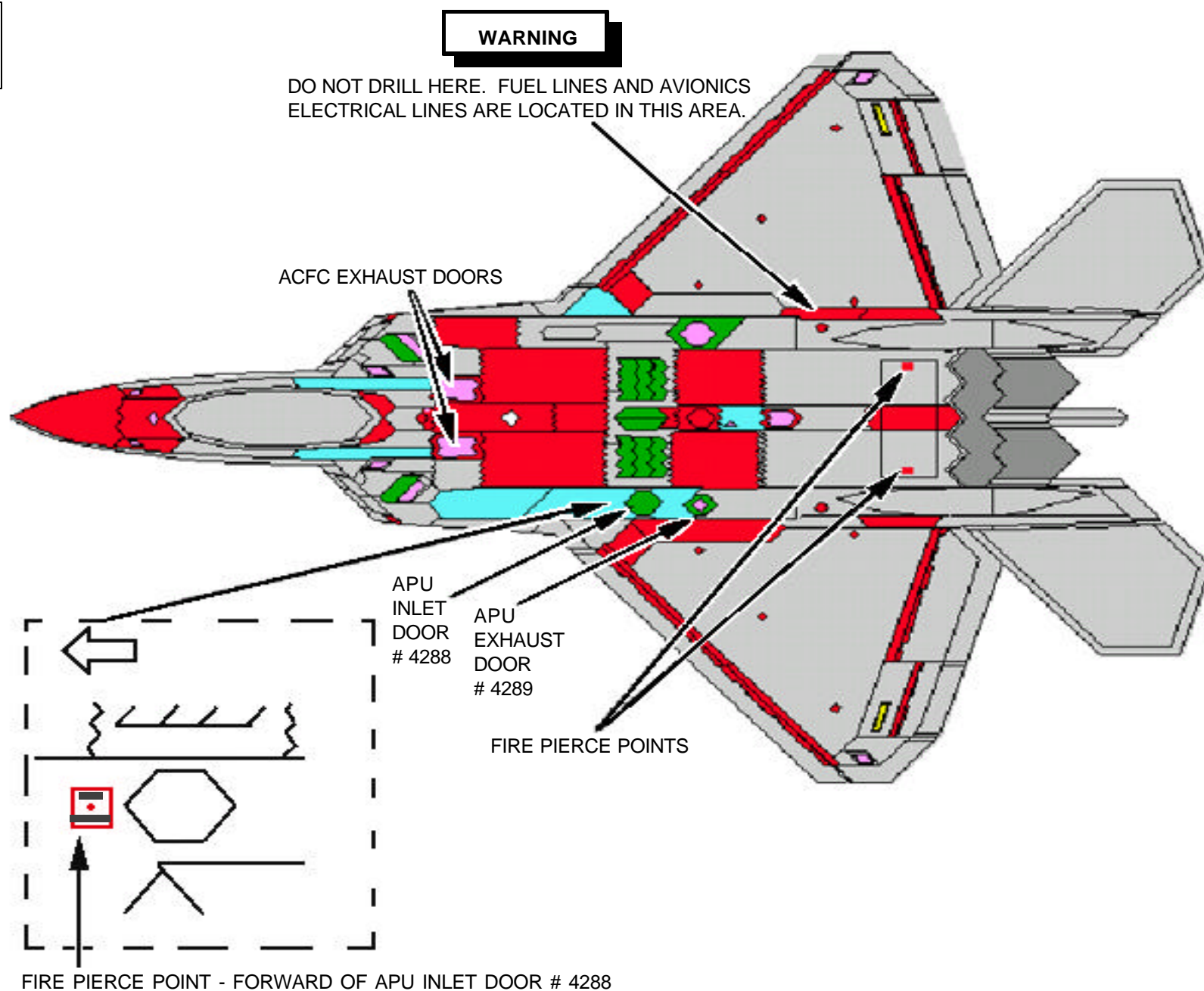
Top View for Screens and Windows

LEGEND



Screens and Windows

F/A-22A





## AIRCRAFT HAZARDS - Continued

HOT BRAKES, CANOPY JETTISON AND SEAT EJECTION TRAJECTORY

### WARNING

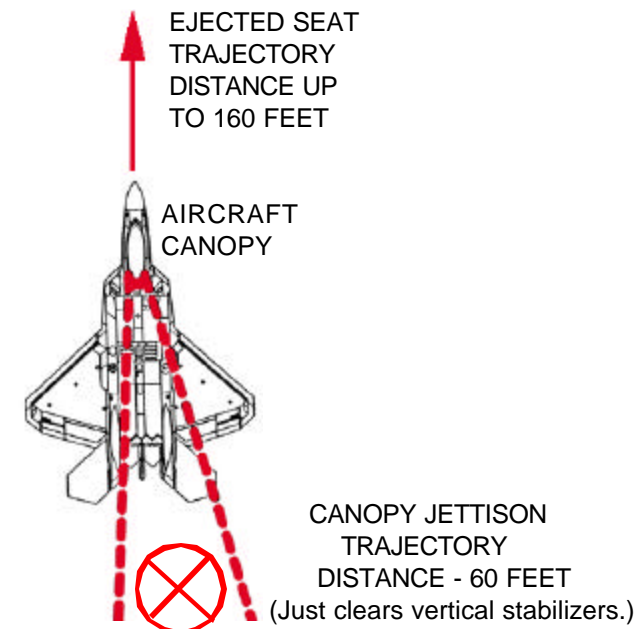
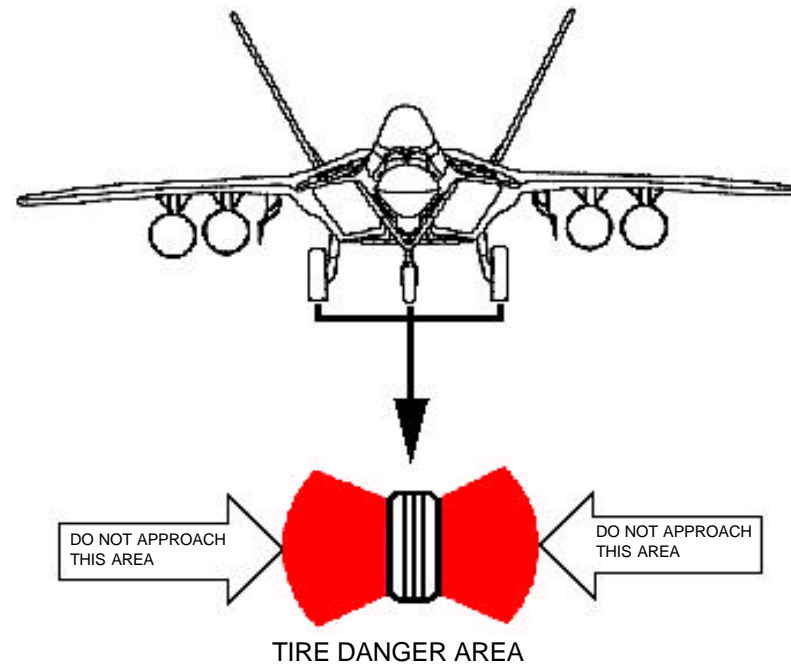
The dangers associated with hot brakes are the same as those associated with any other aircraft and should be approached and treated the same. The approach should be fore and aft, not from the side and this in itself presents hazards from the engine inlets and exhaust. Rescue crews should remember that heat build up in the wheels/brakes will occur after the aircraft has stopped taxiing. The aircraft should be parked and chock main landing gear only with the brakes off. **DO NOT CHOCK NOSE GEAR.** A 45 minute waiting period should be observed. The danger area depicted is the flying shrapnel/debris area, should the wheels/brakes explode.

### WARNING

The ARFF/crash/rescue crew should be aware of the jettison trajectory area of the canopy when positioning firefighting equipment/vehicles and personnel when approaching a disabled aircraft, particularly if canopy jettison is anticipated by the crewmember or rescue crew. Danger area is directly aft and to the right of the aircraft centerline. Wind conditions affect the impact area and should be avoided. Distance for a jettisoned canopy has not been determined. Injury or death to personnel will occur if danger area is entered during canopy jettison.

### WARNING

An additional danger to canopy jettison is if the crew member selects a zero-zero seat ejection. The seat impact area will be forward of the aircraft up to 160 feet depending on wind conditions.



F/A-22A



# AIRCRAFT HAZARDS-Continued

## MOVABLE SURFACES DANGER AREAS

### WARNING

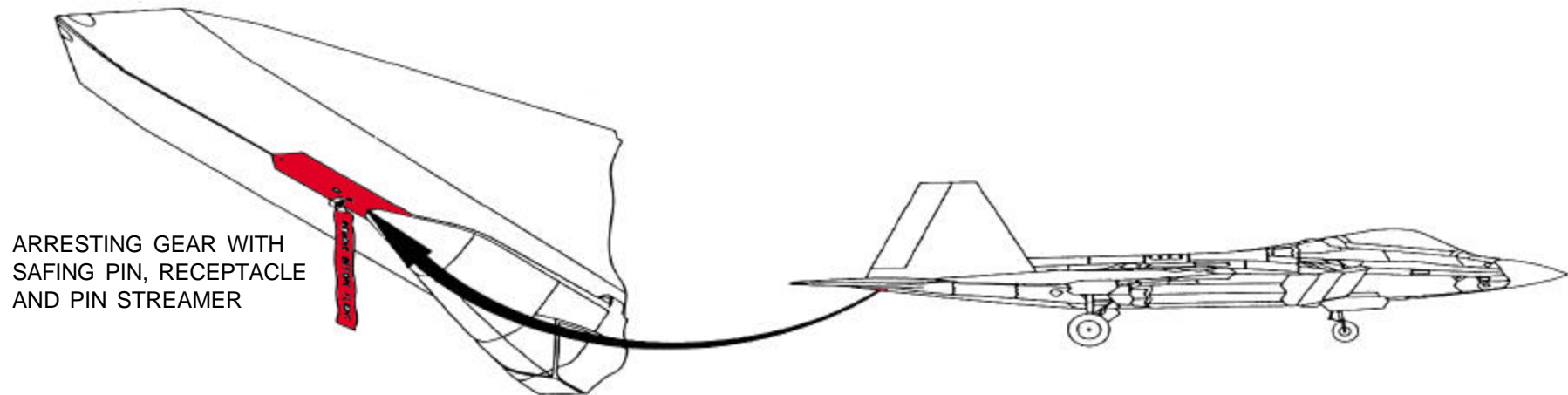
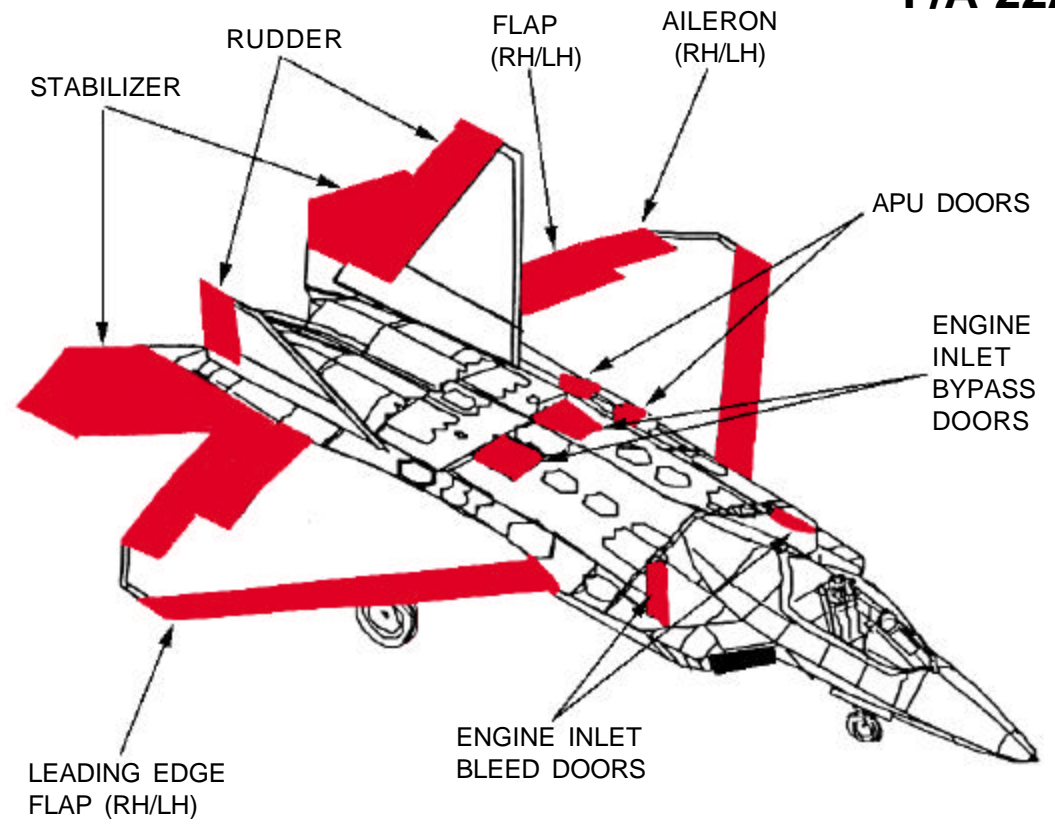
Personnel should stay clear of flight control surfaces when possible with the engines or APU running or external power and hydraulics applied. Danger areas are hi-lited with the rudders posing the least hazard. Failure to disregard danger areas can result in Injury or death.

### WARNING

The arresting gear is located far centerline aft of the shoe hook. It is pneumatically extended and hydraulically retracted. Injury or death to personnel can occur during pneumatic operation.

### WARNING

The safing pin prevents the cable movement required to actuate the arresting gear to extend. Personnel should stay clear of Arresting Gear at all times. Injury or death to personnel can occur if the hook safing mechanism fails.



F/A-22A

# AIRCRAFT HAZARDS-Continued

## 1. WEAPONS STORAGE AND LOCATIONS

### NOTE:

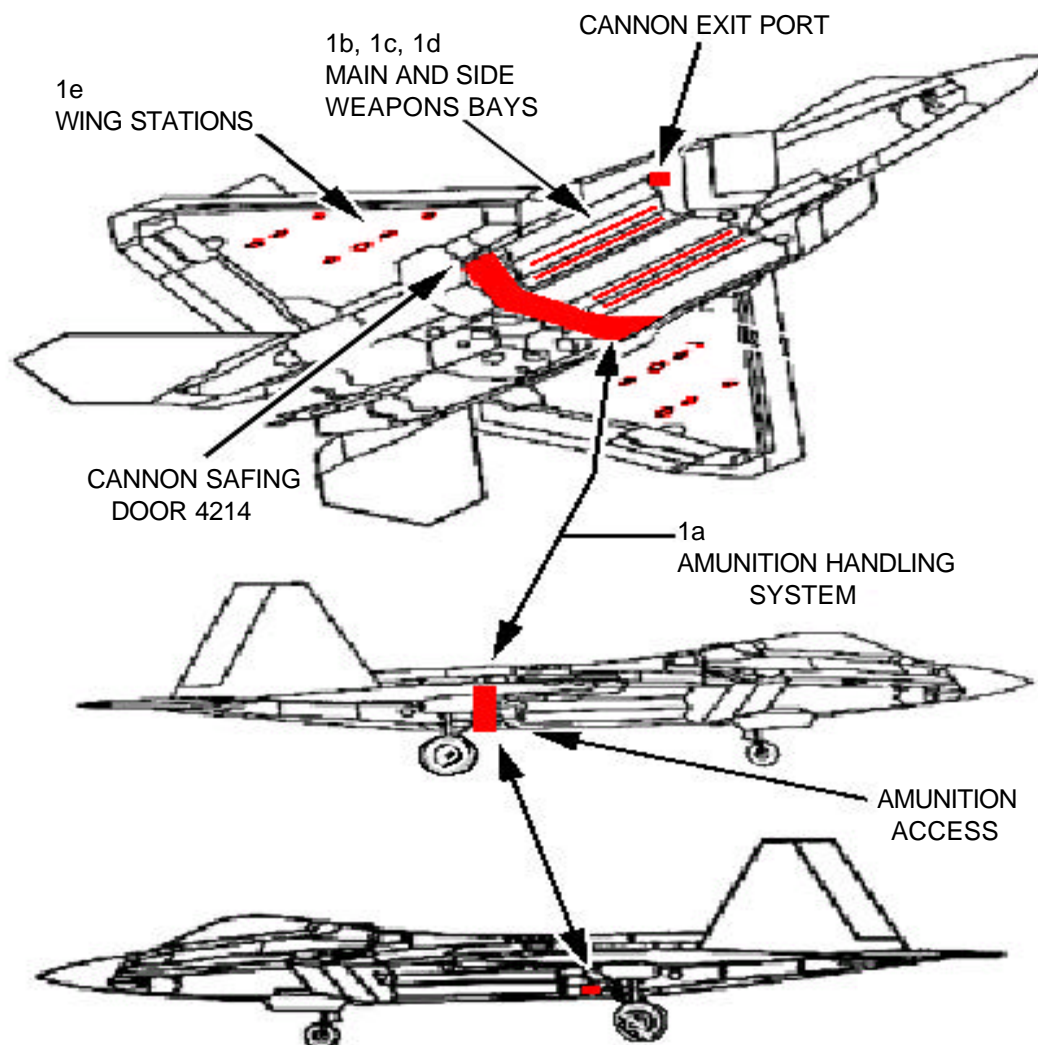
Weapons information is discussed on this page and the next.

- a. Ammunition storage for the M61A2 20mm multibarrel cannon Linear Linkless system located immediately forward of the right main landing gear door and across the belly of aircraft. Storage system is an overlapping conveyor belt design holding 480 rounds.
- b. Air-to Air: AIM-9M/X Sidewinder (1 per side weapons bay on LAU).
- c. Air-to-Air: AIM-120C AMRAAM, 3 per bay - total of 6.
- d. Air-to Ground: 2 GBU-32 1,000 lb. JDAM (Joint Direct Attack Munition) PGMs on BRU-46 bomb racks.
- e. External carriage of 600 gal fuel tanks, AIM-9 and AIM-120 missiles.

### NOTE:

T.O. 1F-22A-1 will contain authorized aircraft configurations.

1a  
LINEAR LINKLESS AMMUNITION HANDLING SYSTEM  
(GUN SHOWN FOR CLARITY)



F/A-22A

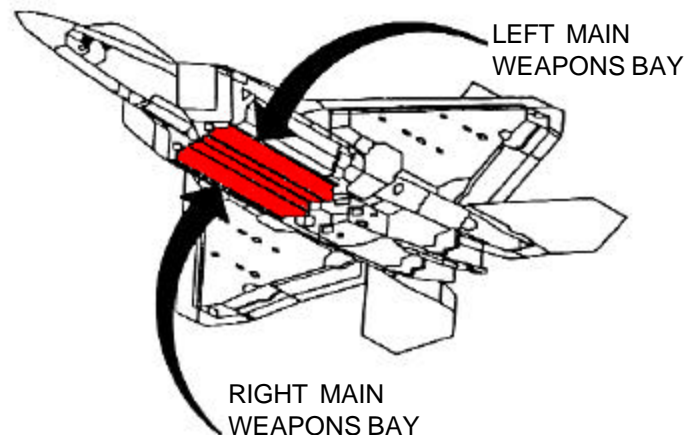
# AIRCRAFT HAZARDS-Continued

AIRCRAFT WEAPONS/ BAY LOCATIONS AND  
COUNTERMEASURES TYPES/DOORS

F/A-22A

## NOTE:

Two evident hazards associated with the weapons bay doors are sharp edges and inadvertent opening and closing. The internal weapons loaded are: up to 6 AIM-120 missiles and AIM-9 missiles. Missile launchers are safed by PUSH/PULL handles located on each launcher. All bay doors pictured are closed.

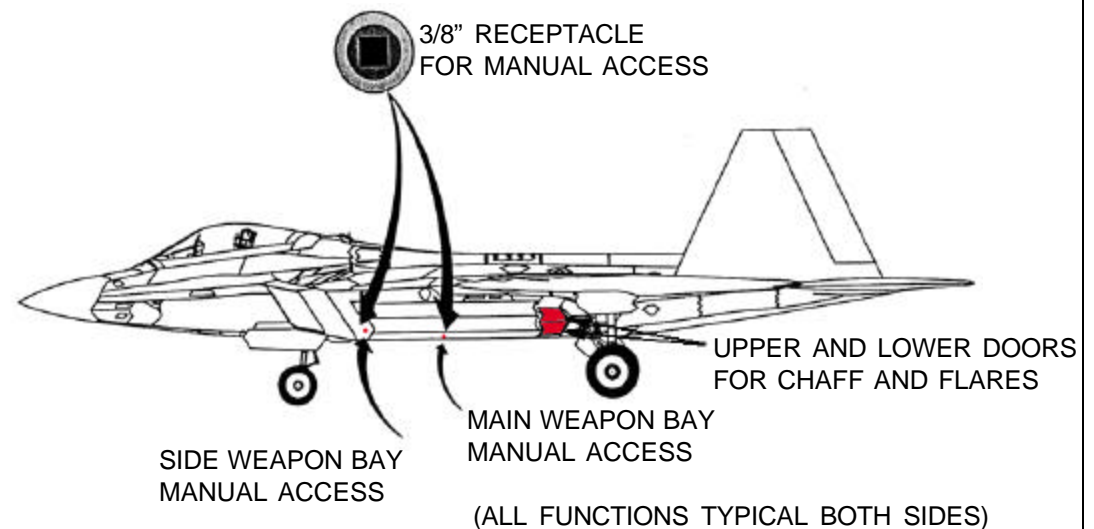
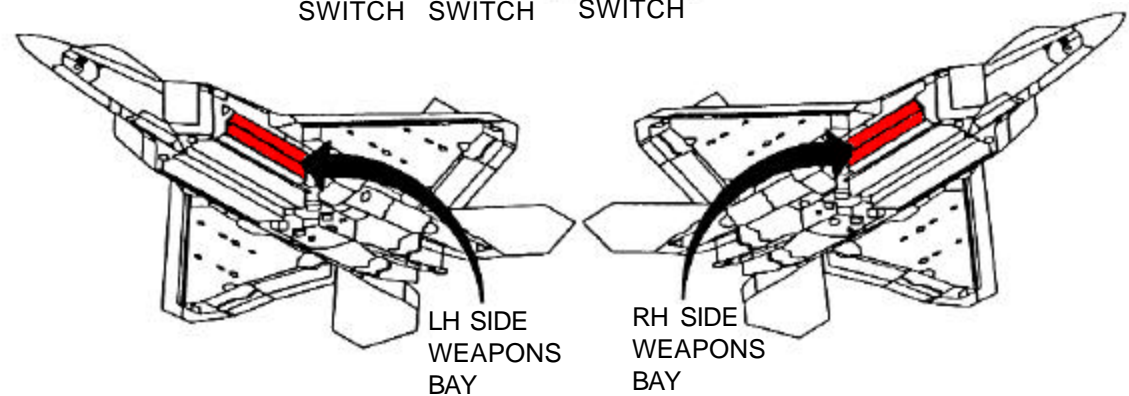
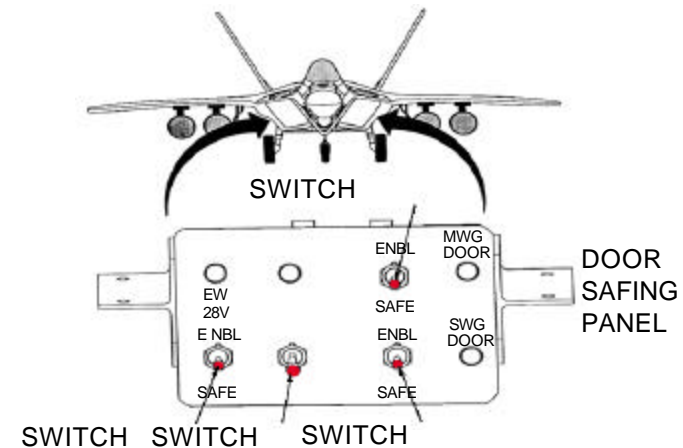


## NOTE:

The Countermeasures Doors are located on each side of the aircraft between the landing gear doors and weapons bays doors. The doors provide for accessing and dispensing chaff and flares. The doors are opened on the ground utilizing the Portable Maintenance Aid when electrical and hydraulic power is available. Door Safing Switches are located in the Main Landing Gear Wheel Well on each respective side of the aircraft.

## WARNING

Chaff and flares present an explosive hazard. Personnel should exercise extreme caution to prevent injury or death.



(ALL FUNCTIONS TYPICAL BOTH SIDES)



# AIRCRAFT HAZARDS-Continued

## FUEL STORAGE, OTHER FLUIDS, BATTERY DISCONNECT AND STORED ENERGY SYSTEM

ITEM	TYPE	APPROX. TOTAL QUANTITY
MAIN FUEL TANKS	JP-8	5000 TO 8000 LBS (733 - 1,173 GALS)
APU	JP-8	5 GALS
HYDRAULIC FLUID	MIL-II-83282	35 GALS
BATTERIES	SULFURIC ACID GEL	10 LBS
ENGINE HYD. FLUID	MIL-II-83282	3 GALS
ENGINE OIL LUBE	MIL-L-7808	6 GALS

### NOTE:

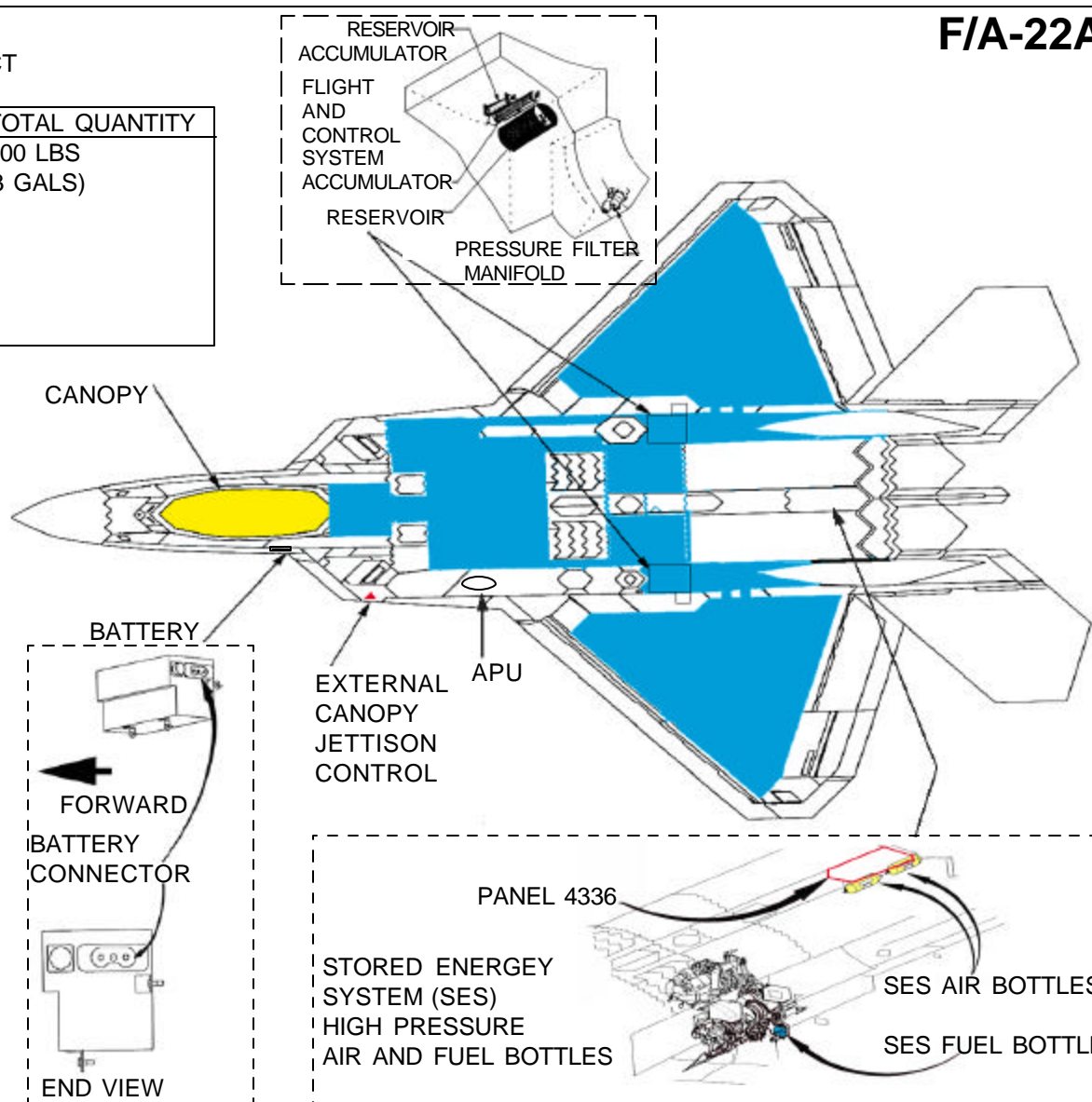
Personnel should prevent the puncturing of the fuel cells. The internal cells are divided into a forward and an aft system with all cells fabricated from an integral-type construction. The three feed cells are in the forward fuselage, and the left and right cells are located in the aft left and right fuselage, respectively. The remaining five cells are transfer cells that utilize gravity feed, ejector pumps, and electrical pumps to transfer fuel to the feed cells. These cells are the two wing cells in the forward mid fuselage and mid fuselage. All the internal cells are pressurized through the vent and pressurization valve which is connected to the On-Board Inert Gas Generating System (OBIGGS).

### NOTE:

The battery and Charger/Controller System (BCCS) consists of the battery and a charger/controller unit supplying 28VDC to aircraft systems. The aircraft battery is located behind the Left Avionics Bay Door # 4135.

### BATTERY DISCONNECT

- The battery switch must be positioned OFF, if possible.
- Disconnect battery terminals at battery disconnect at right side aft of battery.
- If cutting is necessary, cut through thermoplastic door # 4135 to access the battery as required, then disconnect the battery as prescribed in step b.



### NOTE:

The Stored Energy System (SES) provides fuel and high pressure air to the Turbine Power Module (TPM), mounted to the APU gearbox, to start the APU and provide a self-start capability to the aircraft's engines. High pressure air from the SES air bottles is also delivered to the APU door actuation system for door operation, and to the landing gear system for emergency gear extension. Care should be taken to avoid puncturing the fuel filled bottle.

F/A-22A



# AIRCRAFT HAZARDS-Continued

## FUEL TANK LOCATIONS AND QUANTITIES

### NOTE:

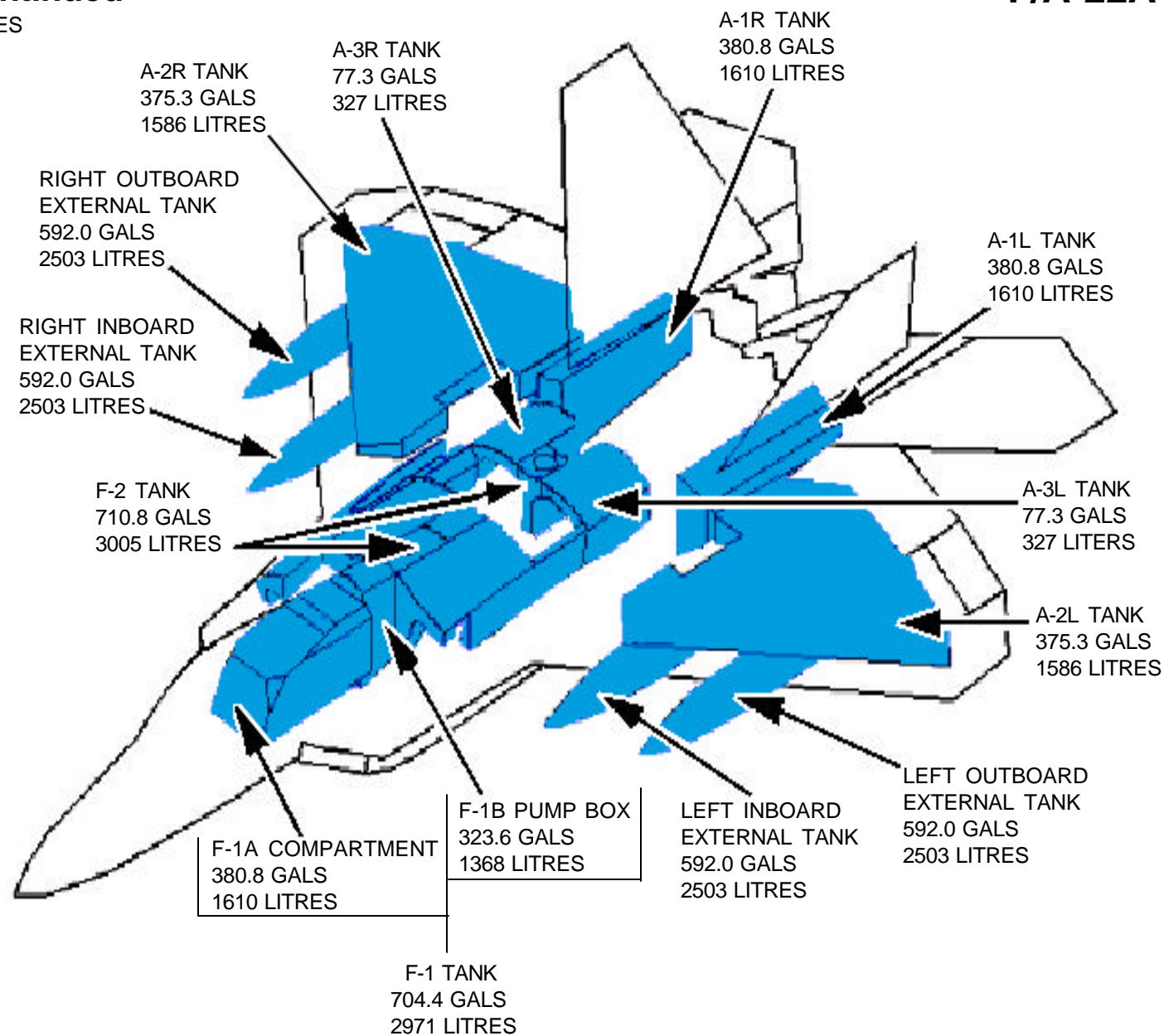
All quantities in US gallons and litres.

### NOTE:

Total fuel: 5,450 gallons, 23,043 litres

Fuel weight: 36,515 lbs.

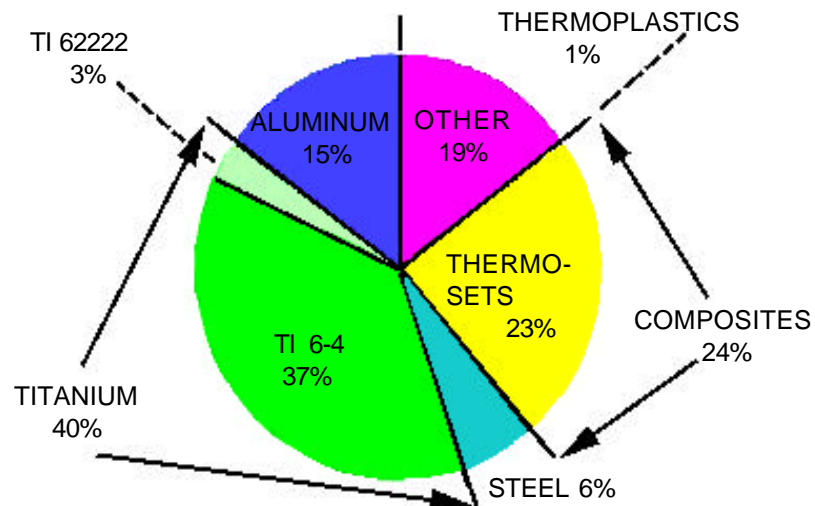
Fuel type: JP-8.



# AIRFRAME MATERIALS

F/A-22A

MATERIALS DISTRIBUTION



## NOTE:

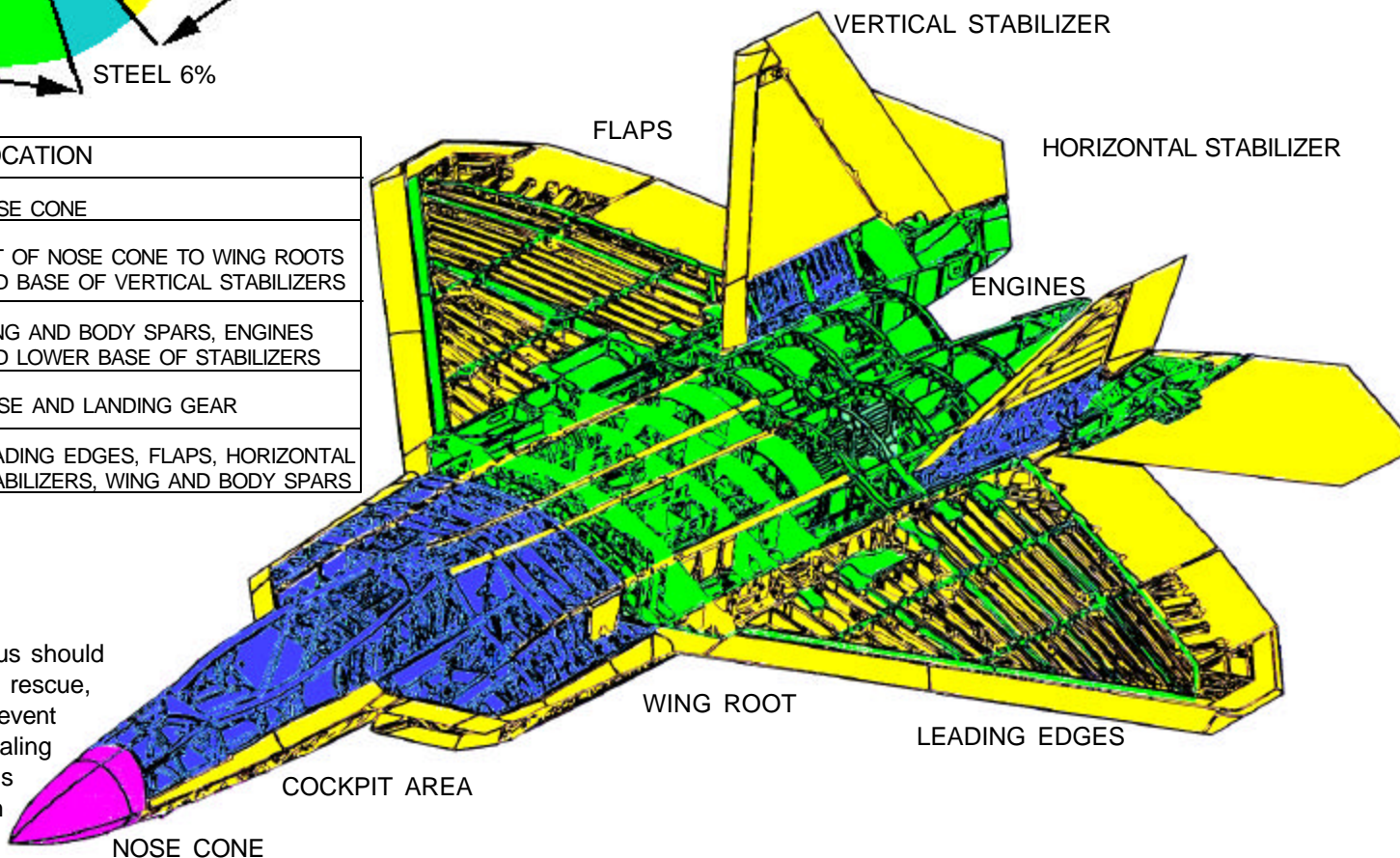
Organic composite structural laminates are made up of stacks of oriented thin lamina that consolidated under heat and pressure. Each lamina consists of a layer of high-strength, high-modulus, low-density reinforcing fibers embedded in a resin matrix. Fibers typically are materials such as carbon, boron, Kevlar 49, or fiberglass. The matrix can be either a thermosetting material such as epoxy, bismaleimide, or polyimide, or a thermoplastic material. If the matrix is thermosetting, a solid material is formed that cannot be reprocessed. Thermoplastic materials, however, can be reshaped by reheating and reforming.

MATERIALS LOCATION

OTHER	NOSE CONE
ALUMINUM	AFT OF NOSE CONE TO WING ROOTS AND BASE OF VERTICAL STABILIZERS
TI 6222 (TITANIUM) TI 6-4 (TITANIUM)	WING AND BODY SPARS, ENGINES AND LOWER BASE OF STABILIZERS
STEEL	NOSE AND LANDING GEAR
THERMOPLASTICS (COMPOSITES)& THERMOSETS (COMPOSITES)	LEADING EDGES, FLAPS, HORIZONTAL STABILIZERS, WING AND BODY SPARS

## WARNING

Self Contained Breathing Apparatus should always be worn during firefighting, rescue, and when removing bunkers to prevent respiratory complications from inhaling composite fibers and dust. Serious health problems will result through failure to observe this warning.



**SPECIAL TOOLS/EQUIPMENT**  
 Fire Drill II Power Rescue Saw  
 2-10' Ladders 3/8" Drive Hand  
 Electric Power Drill

# AIRCRAFT ENTRY

## NOTE:

The canopy actuator has an internal mechanism allowing canopy support at any height.

## 1. NORMAL ENTRY - WITH POWER

- Actuate the canopy up/hold/down switch, located in the nose wheel well on the right sidewall fairing, to the UP position to the desired height.
- Internal canopy up/stop/down switch is located on the right console panel under the right canopy sill as well as the canopy manual unlock handle.

## 2. NORMAL ENTRY - NO POWER

- Rotate the canopy manual adapter, located in the nose wheel well on the forward left sidewall, with a electric power drill or hand tool counterclockwise (3200 to 3600 revolutions) to the full open position.
- EMERGENCY ENTRY**
  - Proceed to Frangible Access Panel #4211, located on left side just aft of left inlet forward from the wing leading edge.
  - Fracture the panel, by hand (do not use a tool), then actuate the external jettison handle by pulling the ring out to jettison the canopy. Cable length is 30". Personnel should be aware of impact area. See page F/A-22.6 for canopy impact area.
  - The internal canopy jettison handle is located on the left console, left of the throttles, under the left canopy sill.

## WARNING

If pilot is incapacitated and canopy will not open using the external canopy switch, jettison the canopy.

## NOTE:

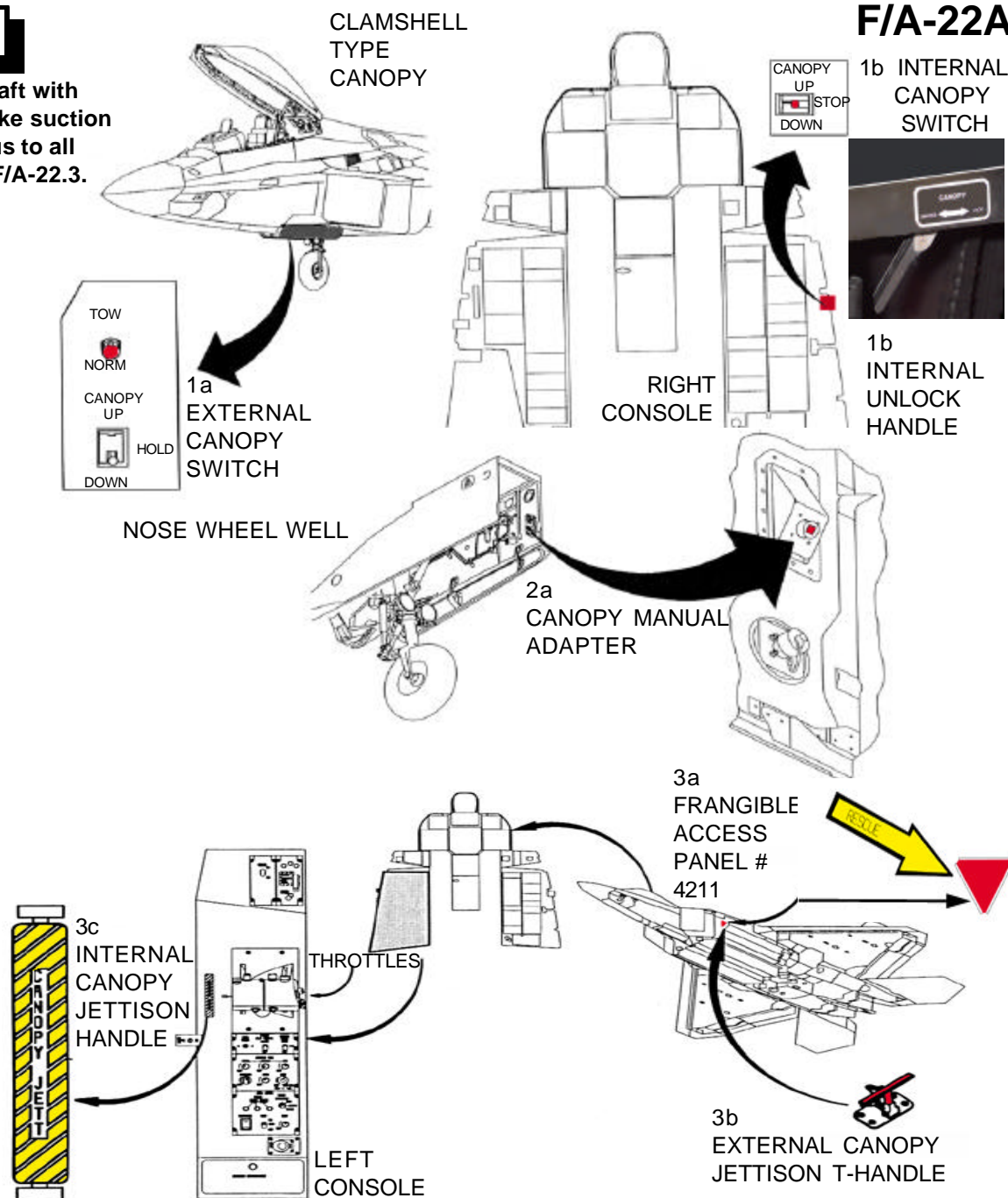
If canopy is jammed after normal landing, do not jettison canopy. Go to 4a.

## 4. CUT-IN

- Cut along the canopy frame on all sides with the power rescue saw to remove the canopy glass.

## WARNING

**Do not approach aircraft with engines running. Intake suction is extremely dangerous to all personnel. See page F/A-22.3.**



F/A-22A



# MAIN FUEL SHUT-OFF ACCESS

F/A-22A

## 1. MAIN FUEL SHUT-OFF ACCESS

### NOTE:

Maintenance access for the main fuel shut off valve actuators are normally under panels # 4536 and 4576 on the lower sides of the aircraft. The valves are installed in the fuel cells, but the Valve Actuators and Manual Shutoff Handles are connected to the valves utilizing a linkage assembly.

### NOTE:

Use this method only, if access to the cockpit is impossible. Bottom MFSOVs #1 and #2 can be drilled or penetrated.

### WARNING

Top and side of MFSOVs #1 and #2 should not be drilled or penetrated. These panels have fuel lines and avionics instrumentation wiring underneath. Drilling and penetrating should be done from the bottom only.

### WARNING

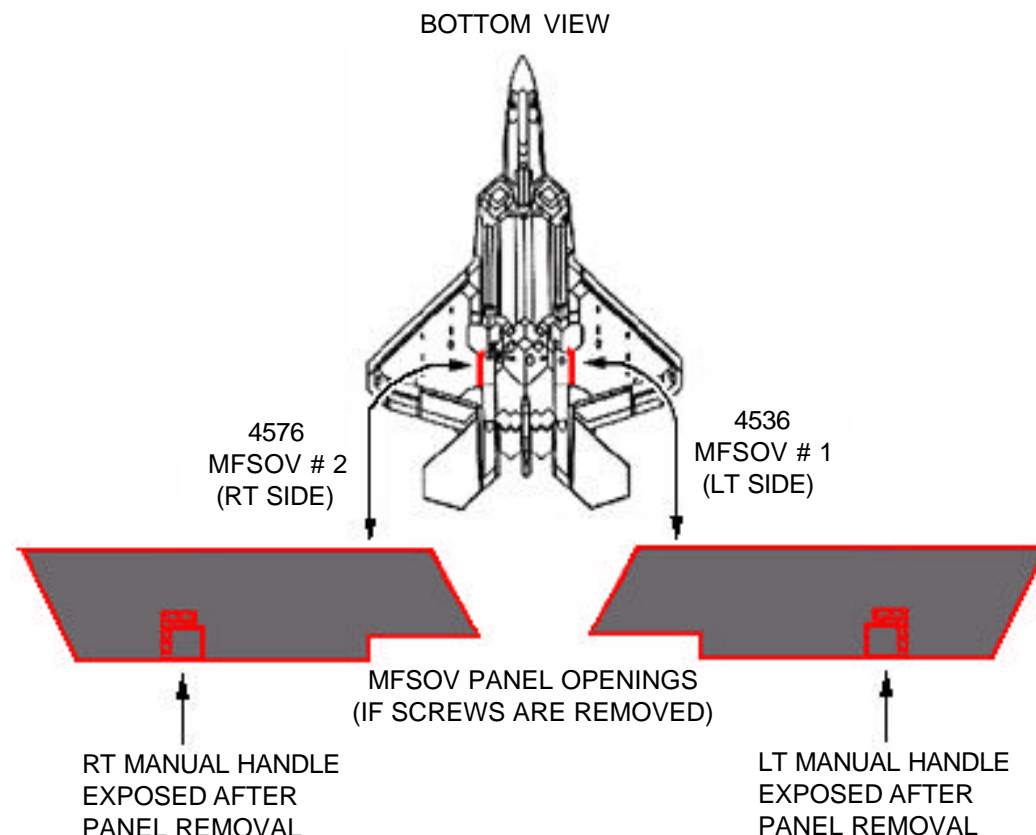
Cutting through wrong area may damage the MFSOV handle and prevent the use of the MFSOV.

- Remove or break through access panels at fourth lower screw from right on left panel and left on right panel.
- Remove the MFSOV electrical connector or cut the connector wires prior to manually actuating the valve.

### NOTE:

The aircraft will continue to supply power to actuate the MFSOV to the position commanded by the Fire Switch/Light in the cockpit until power is terminated.

- Manually position the valves to close by positioning the Flapper Type Handles Full DOWN. Full UP is open. Depending on the RPM of the engine selected for shutdown, spool downtime can be 14 to 29 seconds.





# APU/ENGINE SHUTDOWN

## 1. APU SHUTDOWN

### NOTE:

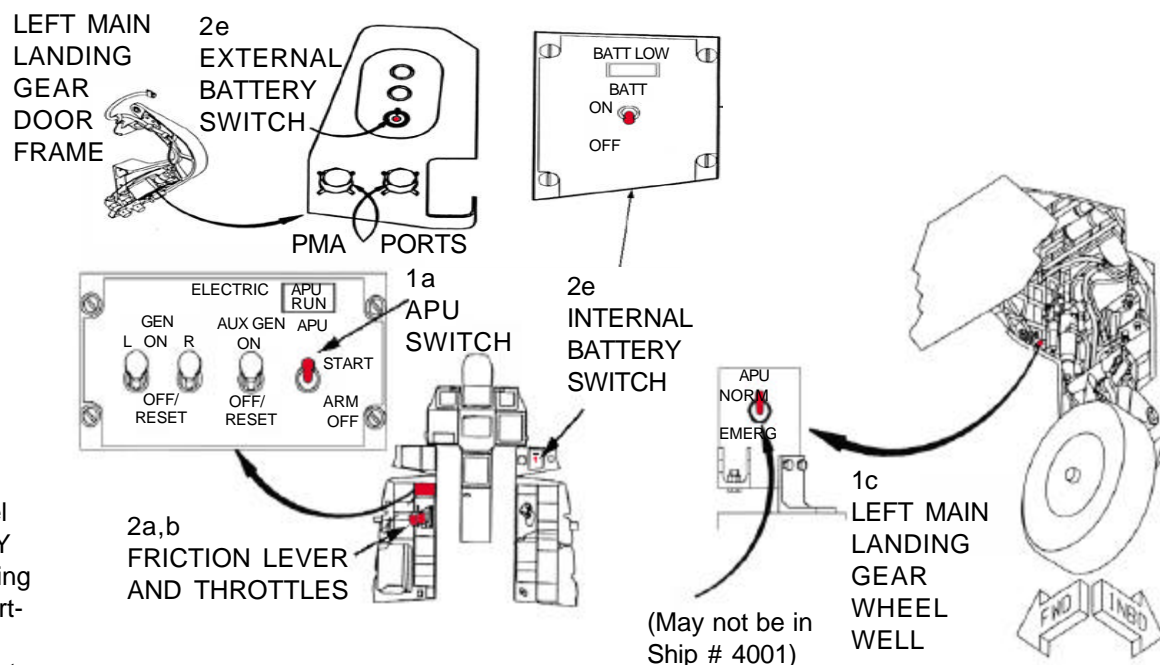
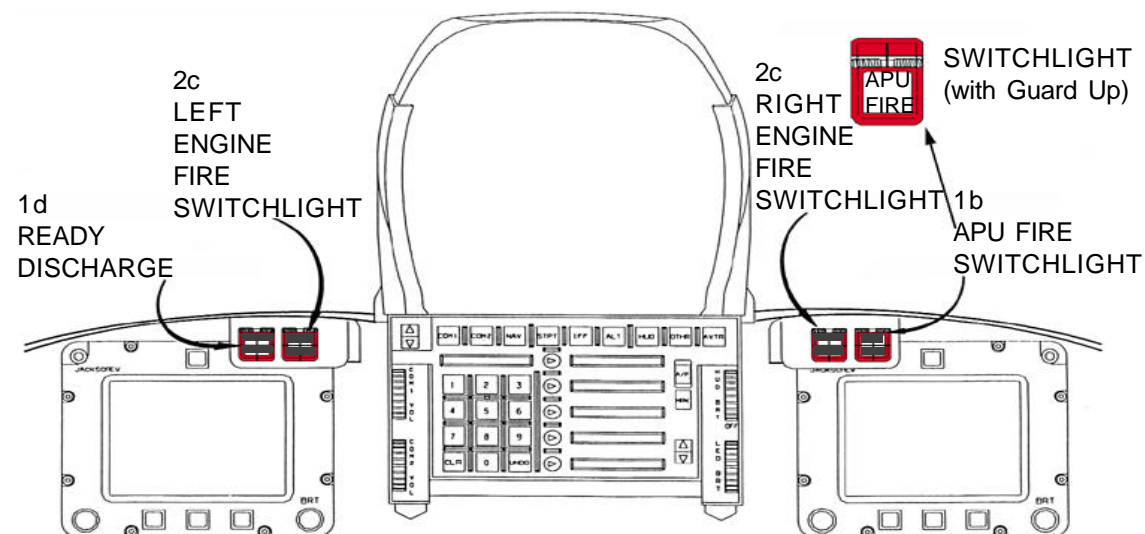
- There are five (5) ways to shutdown the APU.
- (1) Position the APU switch to OFF.
- (2) Position the APU Emergency Shutdown switch in the left wheel well to EMER OFF.
- (3) Flood the APU inlet with extinguishing agent.
- (4) Command the APU to shutdown using the PMA.
- (5) Depress the APU FIRE Switchlight.

- a. Place the APU switch, located on the Electric Panel left console forward of throttles, to OFF.
- b. The APU FIRE Switchlight, located on the right glare-shield eyebrow, illuminates when a fire in the APU Compartment has been detected. Depressing the switchlight, on the ground, will shutdown the APU.
- c. The Emergency Shutdown Switch, located on the forward inboard side of the left main landing gear wheel well allows ground personnel to shutdown the APU during an emergency situation.

## 2. ENGINE SHUTDOWN

- a. Pull the friction lever, located left of left engine throttle, aft, to release throttle friction.
- b. Place the engine throttles, located on the left console, aft to lift over gate and continue aft to OFF.
- c. Depress the ENG FIRE warning switchlight, located on forward instrument panel, if illuminated. This action shuts off fuel, electrical power, ventilation, and air to the affected engine and arms the fire suppression system.
- d. If fire light remains illuminated: When the fire extinguisher is ready to discharge the extinguishing agent, the READY/DISCH switchlight, located on the forward instrument panel illuminates. When the switchlight is depressed, the READY light goes off and the DISCH switchlight illuminates indicating that the halon has been discharged to the selected compartment.
- e. Position battery switch, located on right corner panel, down to OFF. Another battery switch is located on the left main landing gear door frame above the PMA ports for external battery shutoff.

## APU/ENGINE FIRE SWITCHLIGHTS



## APU SHUTDOWN CONTROLS

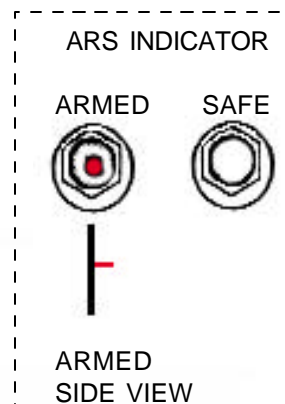
# SAFETYING EJECTION SYSTEM AND AIRCREW EXTRACTION

F/A-22A

## 1. NORMAL SAFETYING OF ACES II EJECTION SEAT

### WARNING

A Seat Armed Indicator located on the lower right side of the seat can indicate WHITE for OK and RED for SEAT ARMED. This indicates that the Advanced Recovery Sequencer (ARS) battery condition is serviceable or expended. If expended, the white sealant will be punctured by a protruding red pin. If this is a recent condition, it will take two hours for the seat to be considered safe to work around or remove. Electrical battery power is required to energize the recovery sequencer circuits for the numerous explosives on the seat. Use extreme caution and judgement in this case. If time permits, call the local Egress Shop before proceeding. If emergency exists and time does not allow inspection by the Egress Shop, sever all exposed electrical leads



### NOTE:

Do not touch indicator sealant when checking condition. Frequent touching wears off sealant exposing tip of red pin indicating a false ARMED ARS condition.

### NOTE:

The F/A-22 employs the ACES II Ejection Seat structurally similar to the F-16 seat version. Pitot tubes are stowed to prevent grasping while entering the cockpit.

### NOTE:

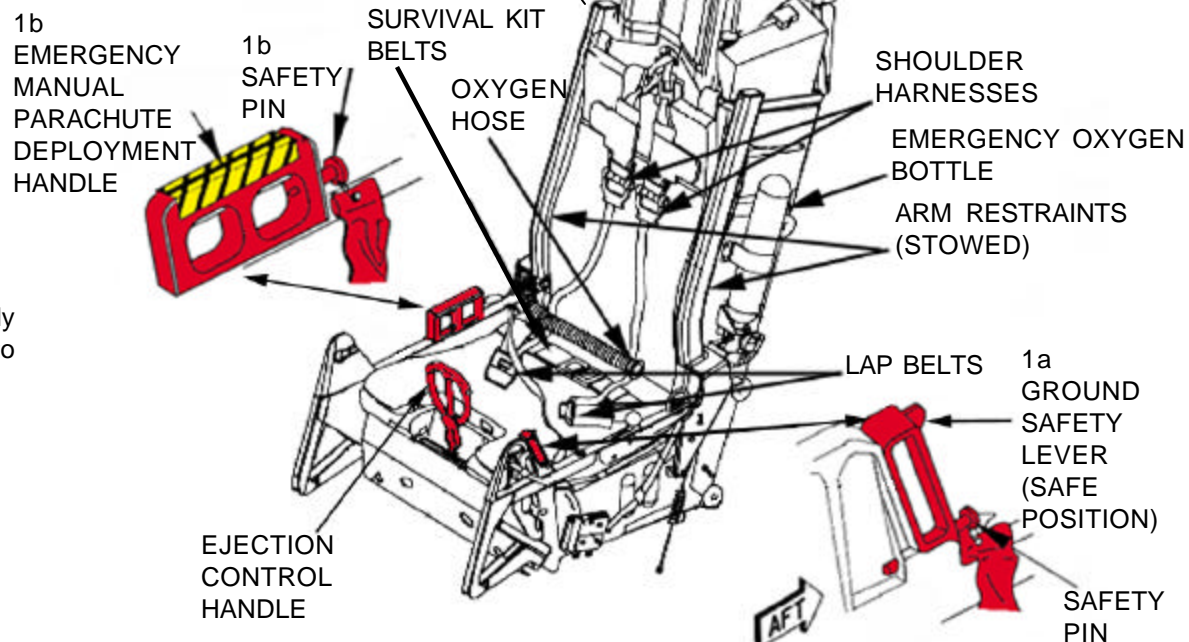
For rescue and extraction, the safety pins for steps a and b should be separate to prevent entanglement.

- a. Rotate Ground Safety Lever, located on left side of seat, UP and FORWARD, and install safety pin in lower part of lever after rotation facing forward.

### NOTE:

The Ground Safety Lever mechanically safes the Ejection Control Handle. There is no safety pin for this handle.

- b. Install safety pin in the Emergency Manual Parachute Deployment Handle aft of handle facing forward.



# SAFETYING EJECTION SYSTEM AND AIRCREW EXTRACTION-Continued

## NOTE:

The Emergency Manual Parachute Deployment Handle can not be pulled upward. For obvious reasons, this handle **can not** be used in the process for extracting the pilot from the seat.

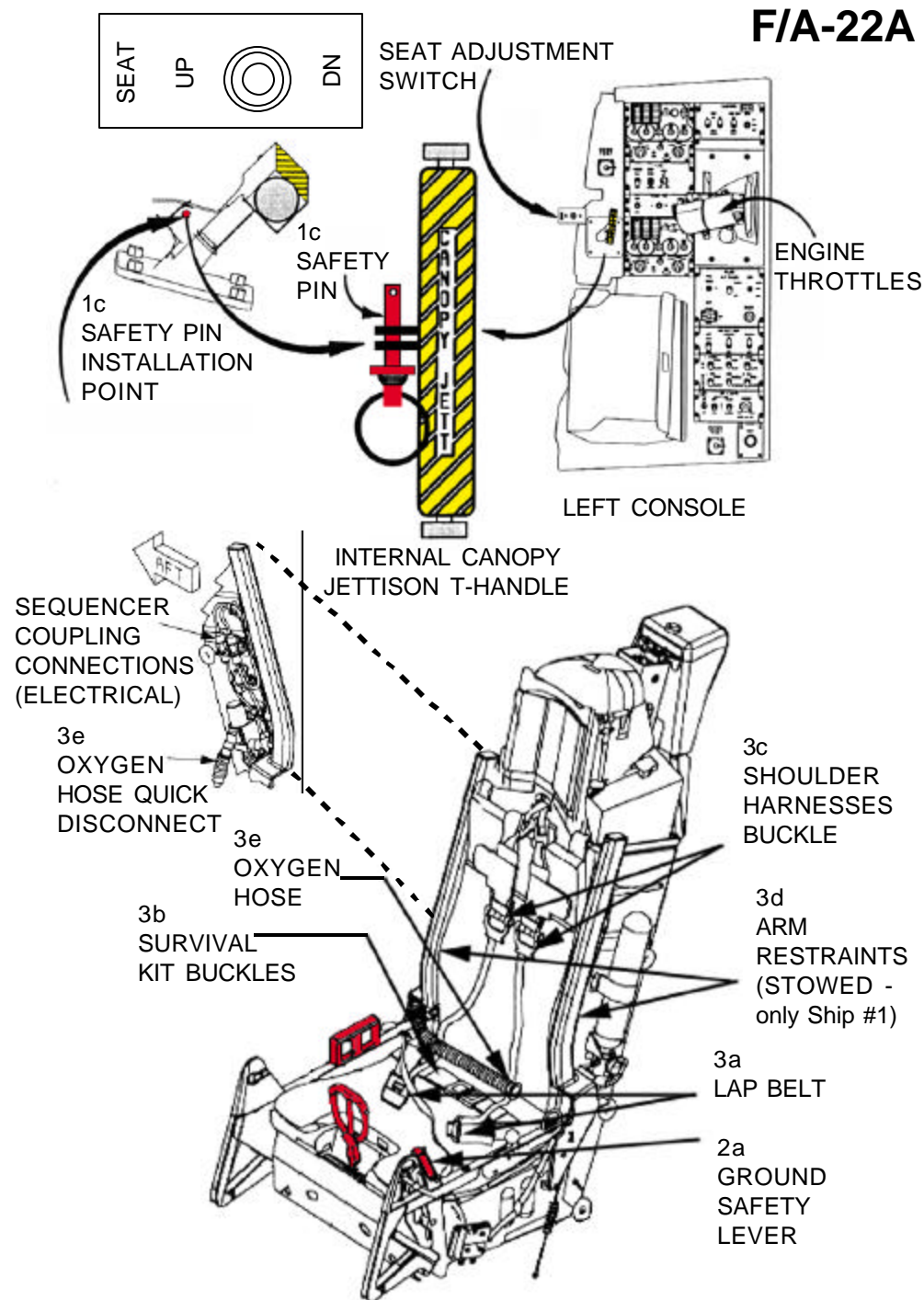
- c. Install safety pin in the Internal Canopy Jettison T-Handle located on the outboard left console, left of the engine throttles.

## 2. EMERGENCY SAFETYING EJECTION SEAT

- a. Rotate Ground Safety Lever, located on left side of seat, UP and FORWARD.
- b. Install safety pin in lower part of lever after rotation facing forward.

## 3. AIRCREW EXTRACTION

- a. Disconnect lap belt by lifting cover and pulling release bar.
- b. Disconnect left and right survival kit buckles by depressing PUSH TO RELEASE tab on each buckle.
- c. Disconnect left and right shoulder harness fittings/risers by squeezing latch and release bar simultaneously for each fitting.
- d. Remove left and right arm restraints from aircrew's shoulders. (These restraints are only used for Ship #1. Later models are excluded.)
- e. Disconnect normal and emergency oxygen hoses at suit disconnect.
- f. Disconnect communication lead at suit disconnect. See page F/A-22.18.
- g. Disconnect cooling garment hose at manifold. See page F/A-22.18.
- h. Disconnect G suit hose at suit quick disconnect. See page F/A-22.18.
- i. Lift crewmember from seat avoiding feet entanglement with Ejection Control Handle, safety pin streamers and leg restraints.

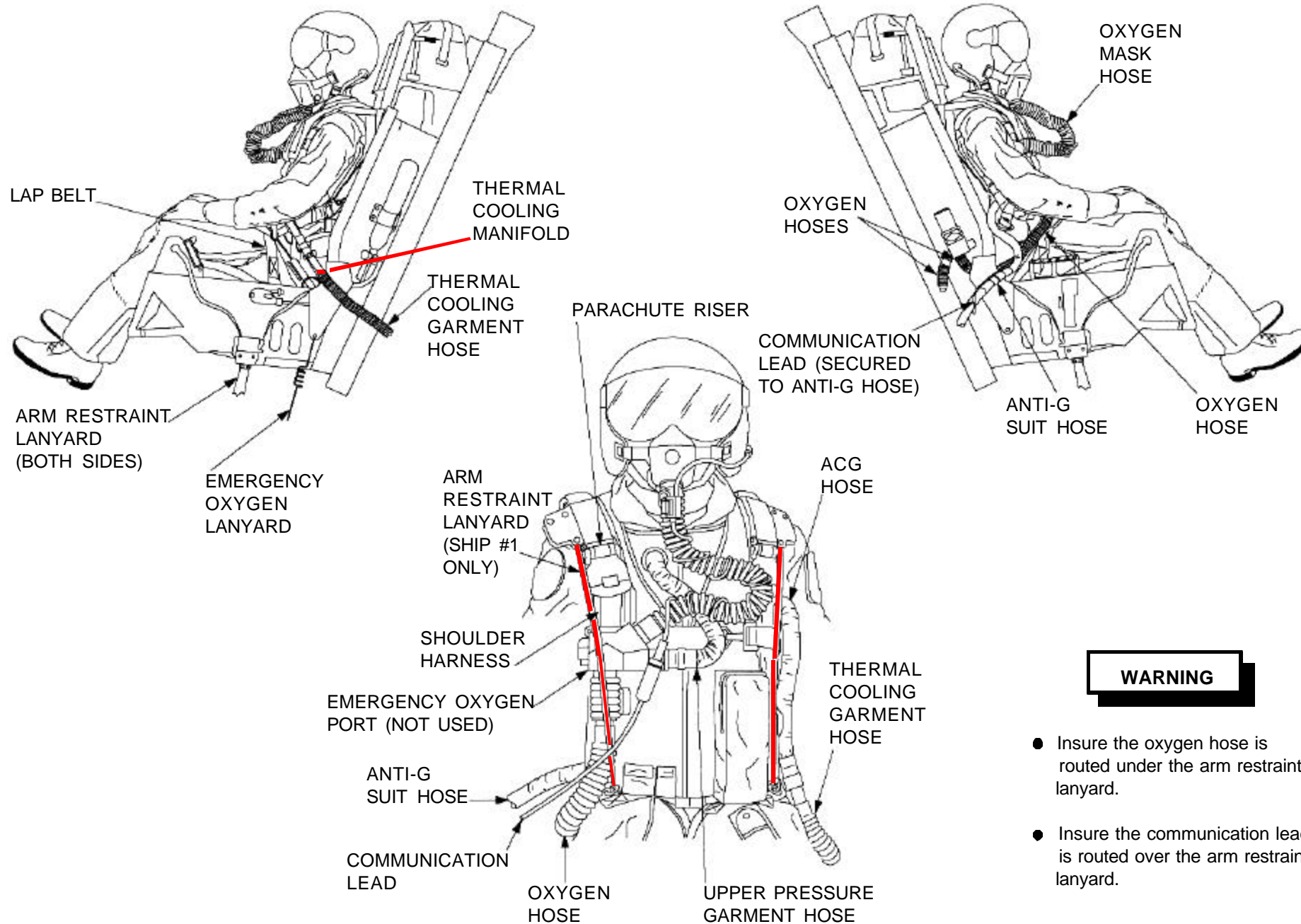




# AIRCREW EXTRACTION-Continued

SEAT AND AIRCREW ORIENTATION

F/A-22A



## WARNING

- Insure the oxygen hose is routed under the arm restraint lanyard.
- Insure the communication lead is routed over the arm restraint lanyard.

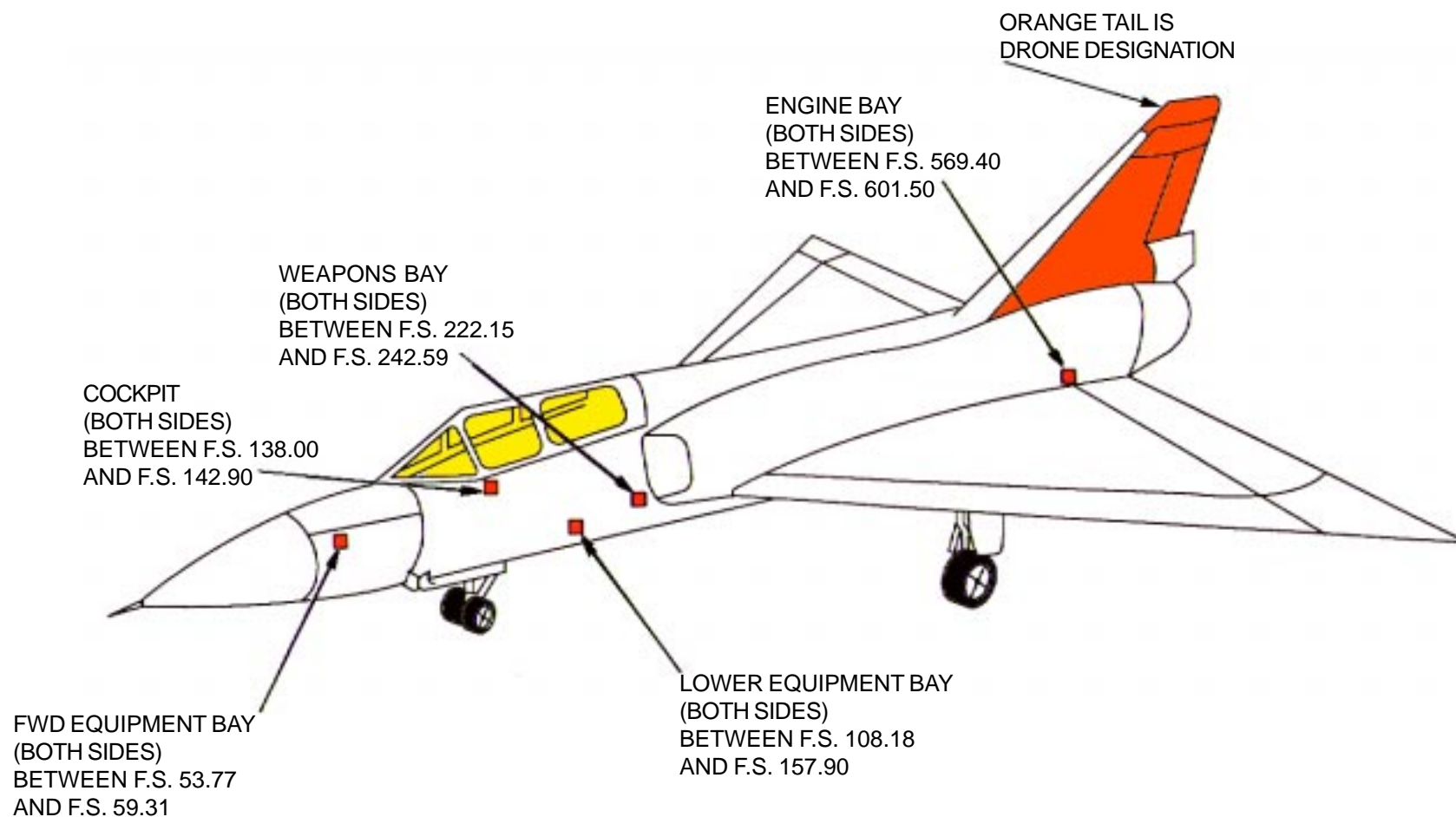


# AIRCRAFT SKIN PENETRATION POINTS

QF-106

## WARNING

In the drone configuration (unmanned-QF), do not attempt fire extinguishment or use the skin penetrator agent application tool. Drone aircraft are equipped with a self-destruction mechanism. Maintain a safe distance of two thousand feet to damaged aircraft. 24 hours time is required for self destruct mechanism batteries to run down before aircraft can be safely approached. Do not attempt to fight any fires if aircraft is unmanned.



## 1. NORMAL ENTRY

## WARNING

Canopy hold open support assembly must be installed between canopy sill and frame. If electrical normal entry is attempted and the battery fails, cut-in procedures will have to be used - A Model.

- a. Open external canopy control access door, located on left forward fuselage.
- b. A Models, pull T-handle out approximately 6 inches, to release canopy latches, and manually raise canopy and install hold open support.
- c. B Models, pull latch handle fully out, rotate up and counterclockwise to stop, pull out about 1/2 inch and rotate down to original position to unlock canopy.
- d. B Models, hold switch in the UP position to open canopy.
- e. On B Models, if canopy does not open, pull down on canopy motor brake release handle, manually raise canopy and install hold open support.

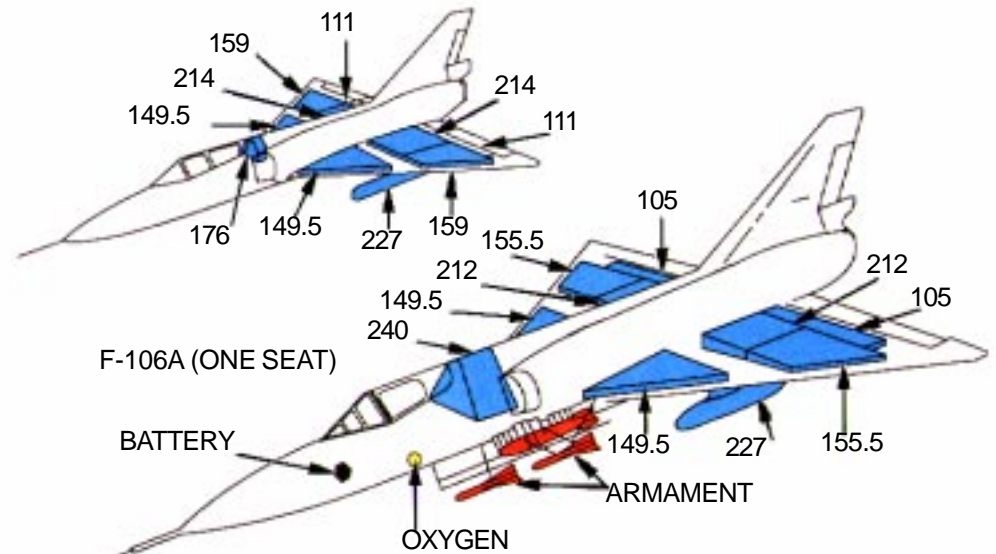
## 2. EMERGENCY ENTRY

## WARNING

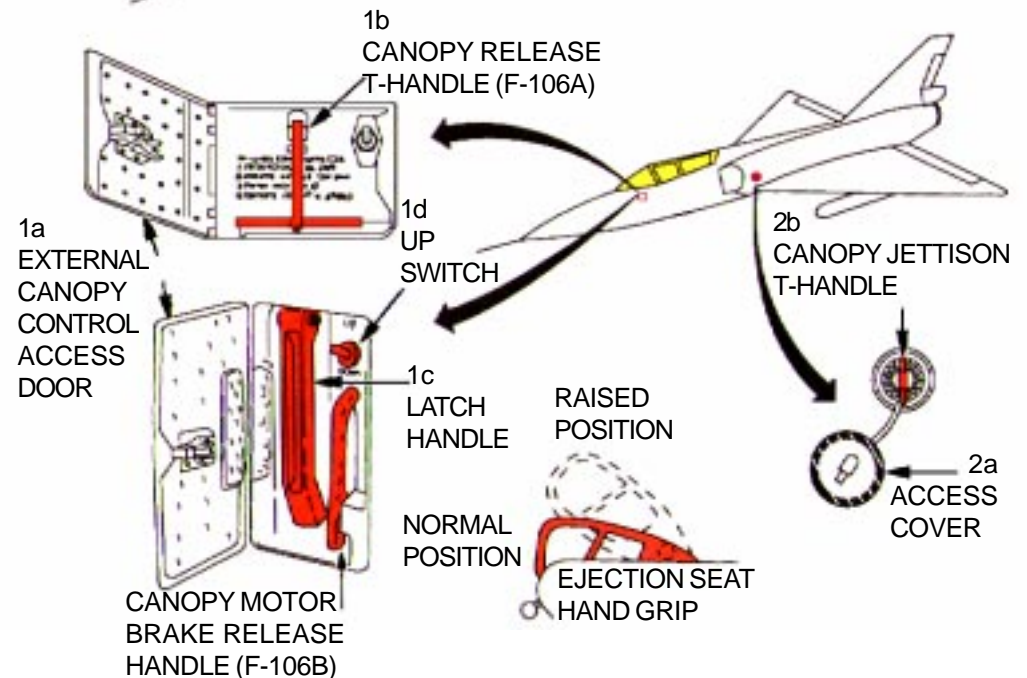
If handgrips are raised, do not pull external canopy jettison T-handle. Use cut-in method. Exercise caution to prevent injury in the event the canopy jettison charge fires while making entry to canopy.

- a. Push latch, located on left side of aircraft, in and remove access door.
- b. Pull T-handle out approximately 6 feet to jettison canopy.

F-106B (TWO SEATS)



F-106A (ONE SEAT)



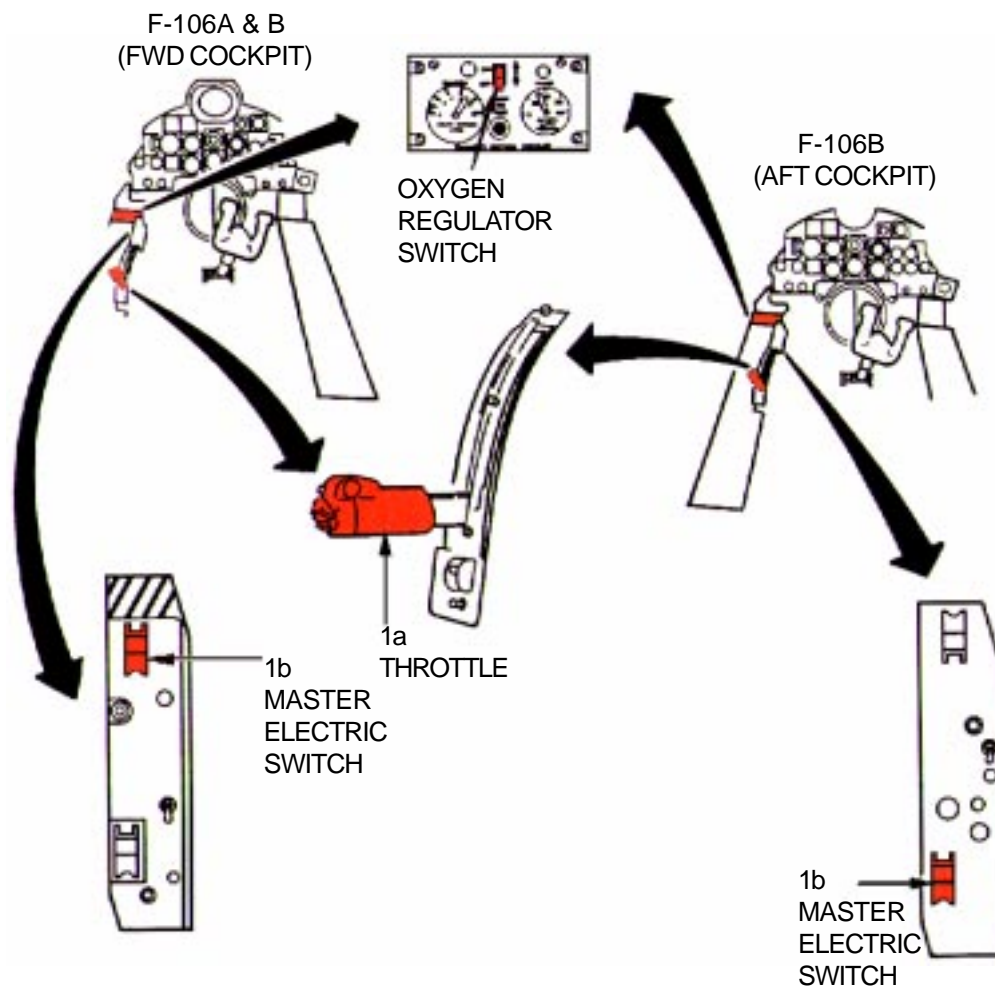
# ENGINE SHUTDOWN

## 1. ENGINE SHUTDOWN

- Retard throttle, located in both cockpits left side outboard and aft, to OFF position.
- Place master electric switch, located in both cockpits left console, to OFF position.

### NOTE:

On F-106Bs, engine shutdown is not possible from aft cockpit.



QF-106

# SAFETYING EJECTION SYSTEM AND AIRCREW EXTRACTION

QF-106

## 1. NORMAL SAFETYING EJECTION SEAT

- a. Insert ground safety pin, stored on right-hand console, into right side of each seat below right handgrip.

## 2. EMERGENCY SAFETYING EJECTION SEAT

- a. Manually trip to separate the ballistic hose quick disconnect, located left and right side of headrest. (A Models have two left side and one on right side.) (B Models have two left side and two on right side.)

### NOTE:

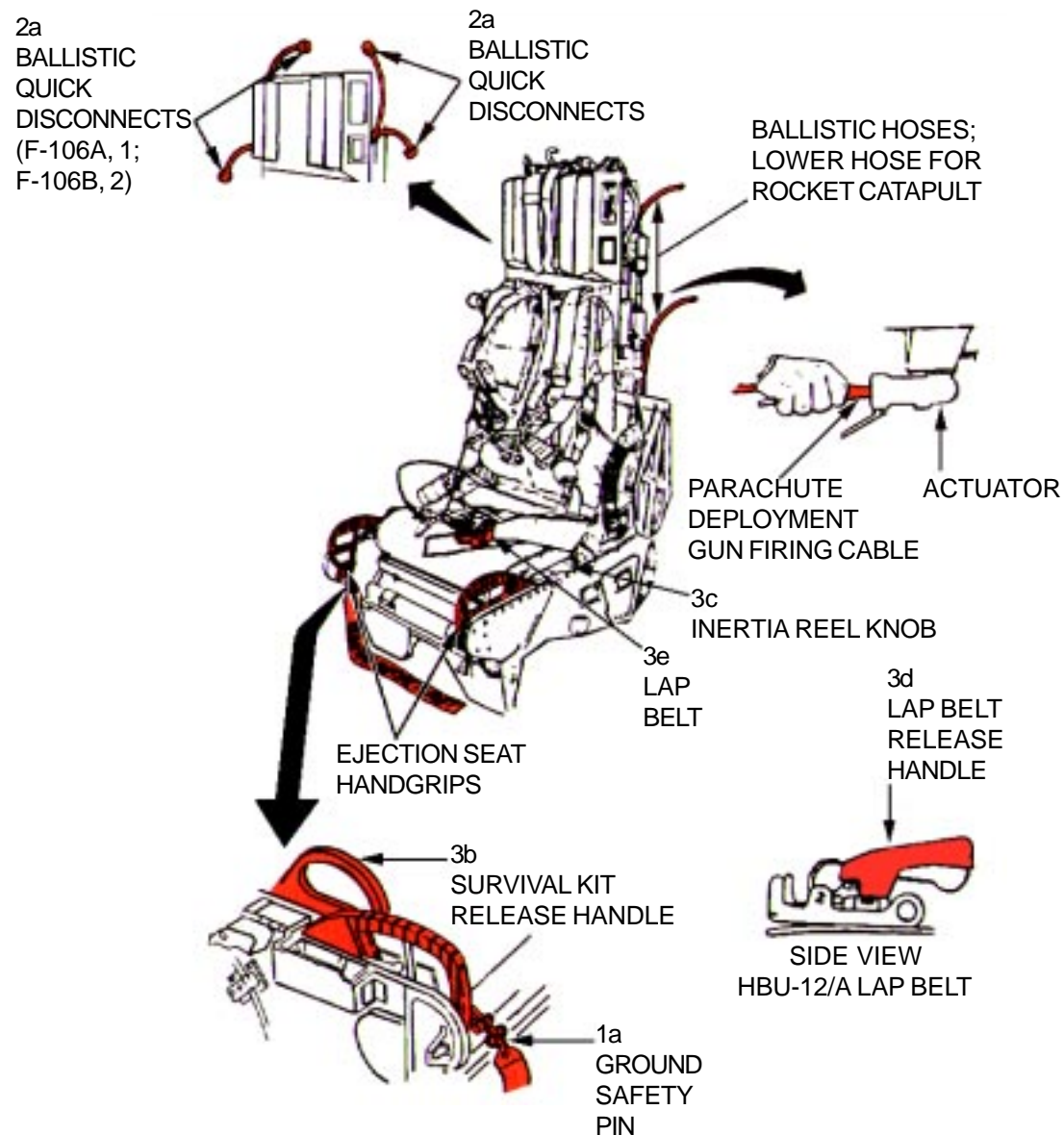
If determined more expeditious, cut catapult ballistic hose, located at lower left side of seat.

## 3. AIRCREW EXTRACTION

### WARNING

Crewmembers are equipped with forced deployed parachutes. Disconnect parachute deployment gun firing cable, located left side of seat, by pulling the quick disconnect out.

- a. Place oxygen regulator switch, located on left side console, to OFF position.
- b. Pull survival kit release handle, located on right side of survival kit, up and aft to release survival kit.
- c. Rotate inertia reel release knob, located on left side of seat structure, and remove shoulder harness restraint straps.
- d. On HBU-12/A lap belt, squeeze together the black and silver grips of the handle and lift up
- e. Separate lap belt.
- f. Remove shoulder harness/negative "G" restraint strap loop ends.





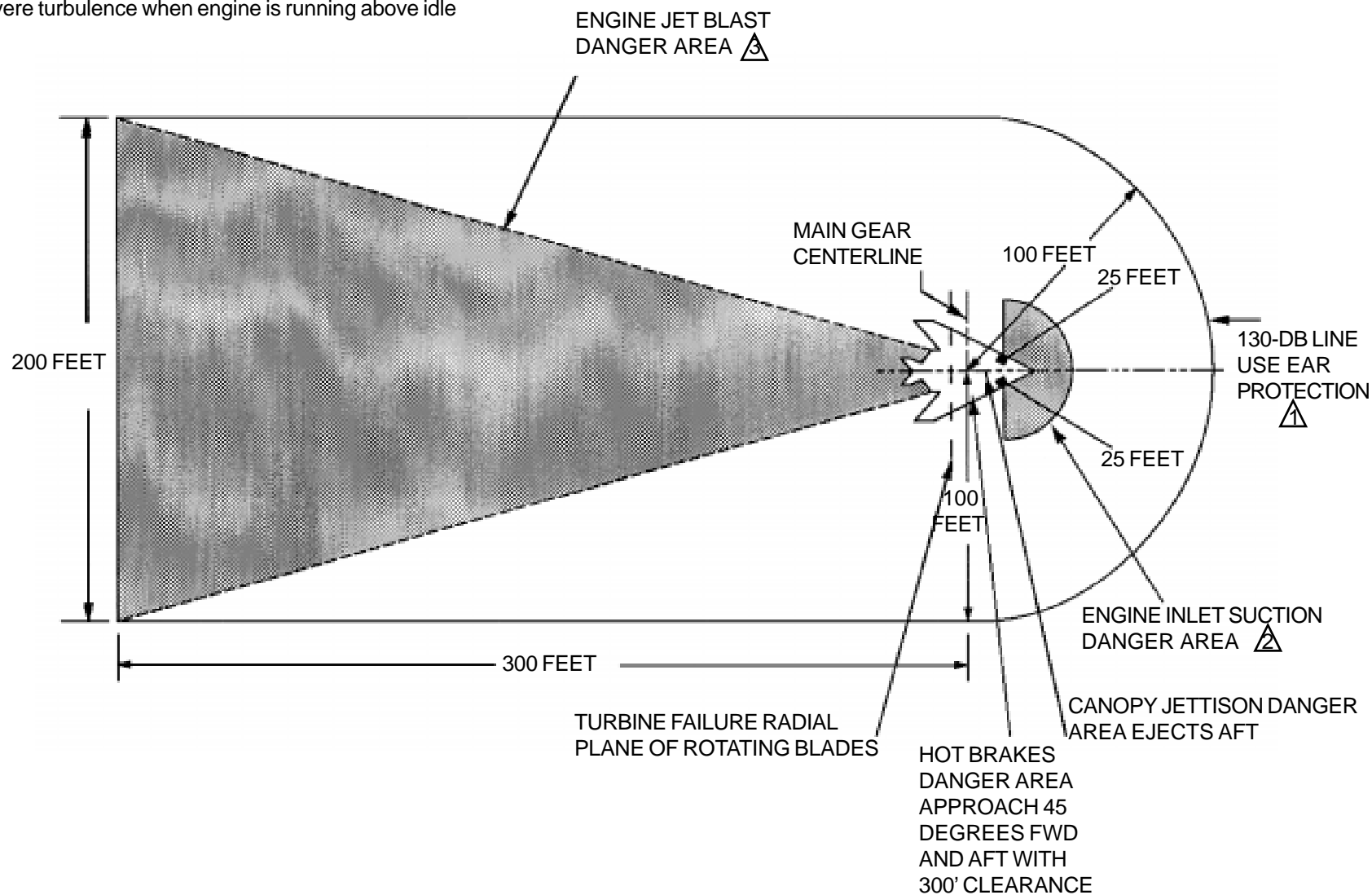
# AIRCRAFT HAZARDS

## NOTE:

- ⚠ When engine is running above idle power, area inside this line will have noise level generally above 130 decibels (db).
- ⚠ This area shall be clear of all foreign objects.
- ⚠ Area of severe turbulence when engine is running above idle power.

## NOTE:







Emergency lighting needed at night.  
There is no RF emission radiation.

**F-117A**


# HAZARDOUS/NON HAZARDOUS AIRFRAME MATERIALS AND DIMENSIONS

F-117A

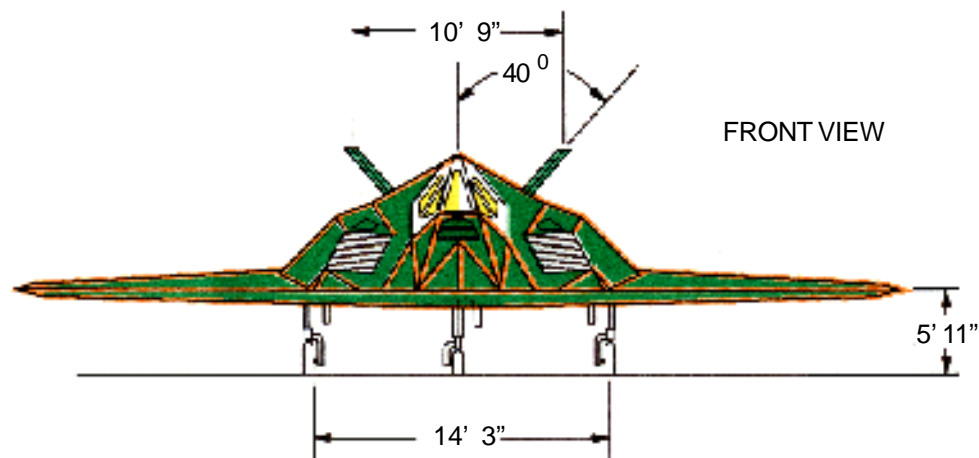
## LEGEND

-  a. ALUMINUM - MAIN BODY
-  b. ALUMINUM - TITANIUM - AFT OF WING ROOTS
-  c. EPOXY FIBERGLASS - EDGES
-  d. GRAPHITE POLYETHERETHERKETONE (PEEK)  
- RUDDER, A PLASTIC THAT BURNS @ 600  
DEGREES WITH TOXIC SMOKE
-  e. GRAPHITE EXPOXY - WEAPONS BAY DOOR
-  f. POLYIMID - AFT TRAILING EDGE - BURNS AT A  
HIGHER TEMPERATURE. > 600 DEGREES

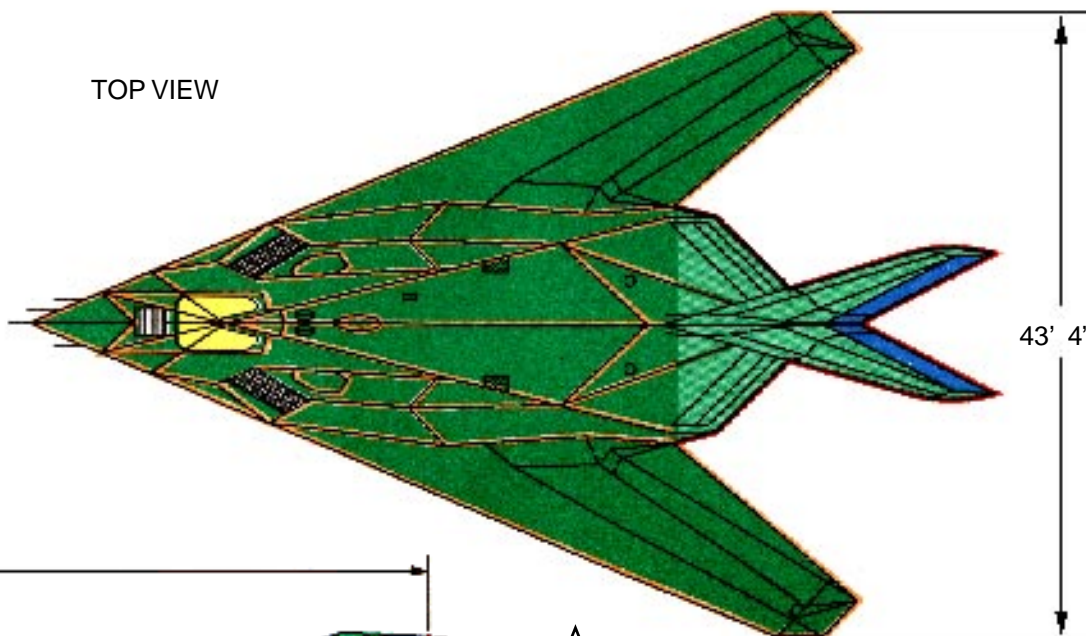
NOTE:  
Composites comprise 5% or less of total structure.

NOTE:  
Polyurethane plastic - paint coating.

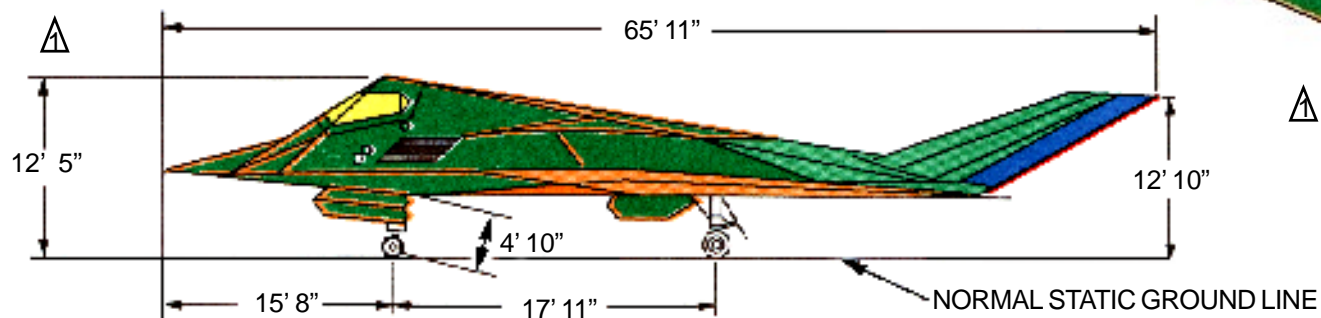
NOTE:  
△ Dimension shown (side view) is for nose and  
main gear struts inflated to 3 inch extension.



TOP VIEW



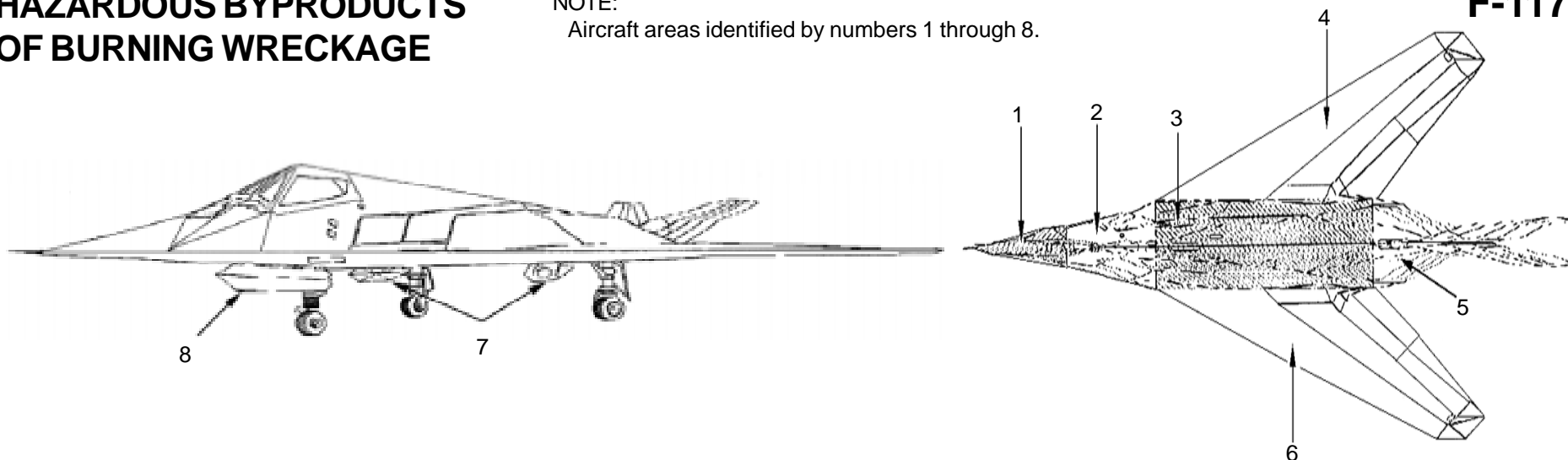
LEFT SIDE VIEW



# HAZARDOUS BYPRODUCTS OF BURNING WRECKAGE

NOTE:  
Aircraft areas identified by numbers 1 through 8.

F-117A



GENERAL MATERIAL	SPECIFIC MATERIAL	AREA USED ON AIRCRAFT	BYPRODUCT
Fuel Hydraulic fluids Lubricants	Fuel, JP8 Oil, low temperature  Oil, synthetic Molybdenum disulfide Grease, various types Fluid, hydraulic, various types	3,4,5,6,7,8	Carbon monoxide Carbon dioxide Sulfur oxides Polynuclear aromatic hydrocarbons Phosphorus oxides
Rubber (gaskets and tires)  Honey comb core Plastics (gaskets, sleeving, electrical and thermal insulations, tubing, canopy, sheets, and parts)	Neoprene Chloroprene Silicones Fluorosilicones Nitriles Polyvinyl chloride Nylons Polyolefins Teflons Polyurethanes Acrylic - polycarbonate Viton, Phenolics, Bismaleimides, Epoxies, and Polysulfide	Throughout aircraft	Carbon monoxide Carbon dioxide Polynuclear aromatic hydrocarbons Hydrochloric acid Hydrofluoric acid Nitrogen oxides Hydrogen cyanide Phosgene Formaldehyde Sulfur oxides

# HAZARDOUS BYPRODUCTS OF BURNING WRECKAGE-Continued

F-117A

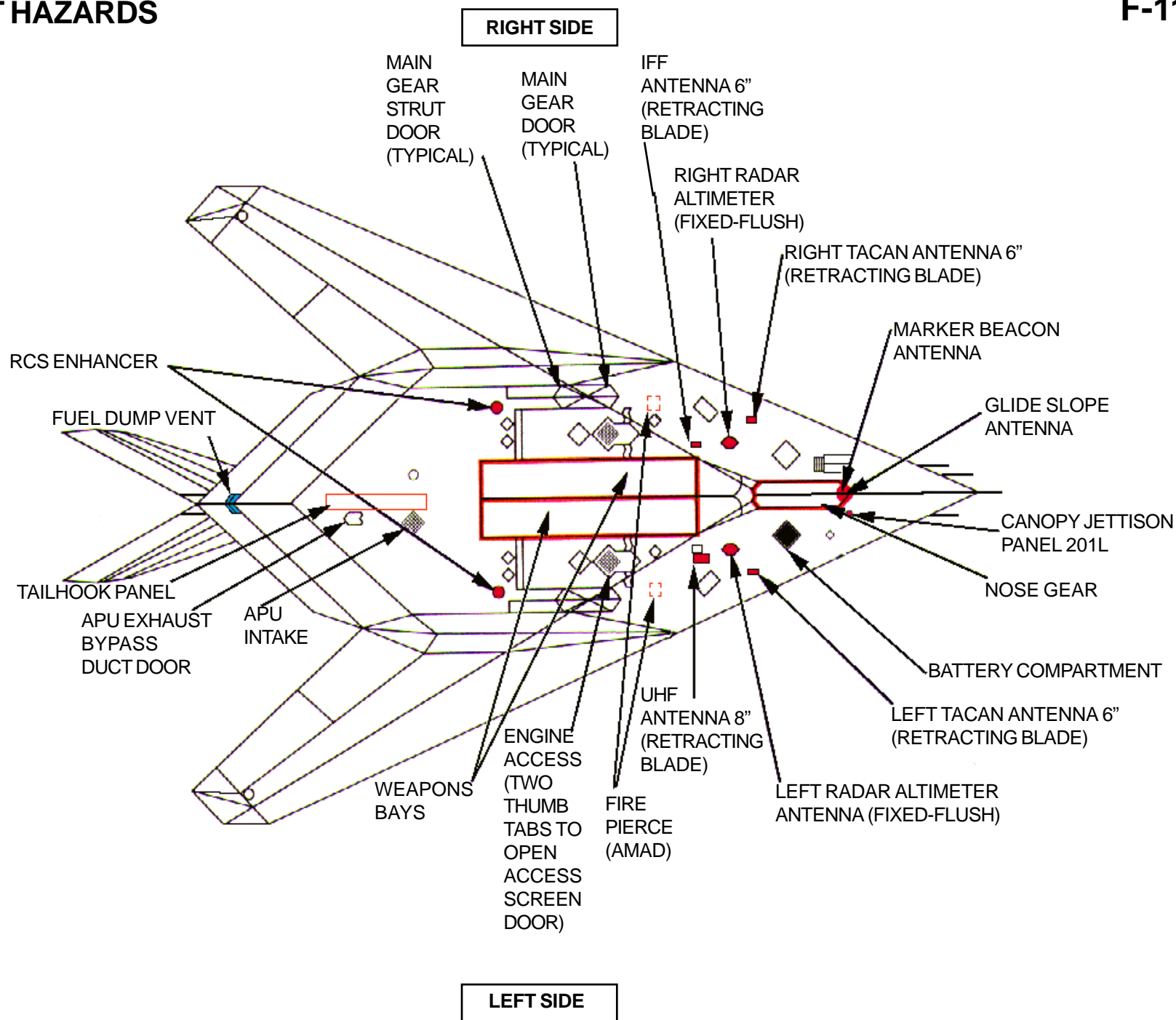
GENERAL MATERIAL	SPECIFIC MATERIAL	AREA USED ON AIRCRAFT	BYPRODUCT
Fabrics and fibers, natural and synthetic	Wool Kevlar Carbon fibers - epoxy coated Glass fibers - aramid, epoxy, teflon, and polyester coated Polyetherether ketone Polysulfide Cellulose	1,2,3,4,5,6	Hydrogen cyanide Nitrogen oxides Sulfur oxides Carbon monoxide Carbon dioxide Polynuclear aromatic hydrocarbons Hydrochloric acid Hydrofluoric acid Phosgene Formaldehyde
Metal alloys - structural, fillers, bonding, and welding	Aluminum, Chrome, Copper, Gold, Iron, Steel, Lead, Silver, Tin, Titanium, Zinc, and Trace metals	Throughout aircraft	All may melt and resolidify. No hazardous emissions.
Blanket insulation and other ceramics	Fiberfrax, Fused ceramic powders	1,3,5	None
Adhesives Sealants Paint Coatings	Polysulfides Silicones Flourosilicones Epoxy Polyurethane Buena - N Iron Silver Silicon dioxide Strontium chromate Lead chromate	Throughout aircraft	Hydrogen cyanide Nitrogen oxides Sulfur oxides Carbon monoxide Carbon dioxide Polynuclear aromatic hydrocarbons Hydrochloric acid Hydrofluoric acid Phosgene Formaldehyde



# AIRCRAFT HAZARDS

BOTTOM VIEW

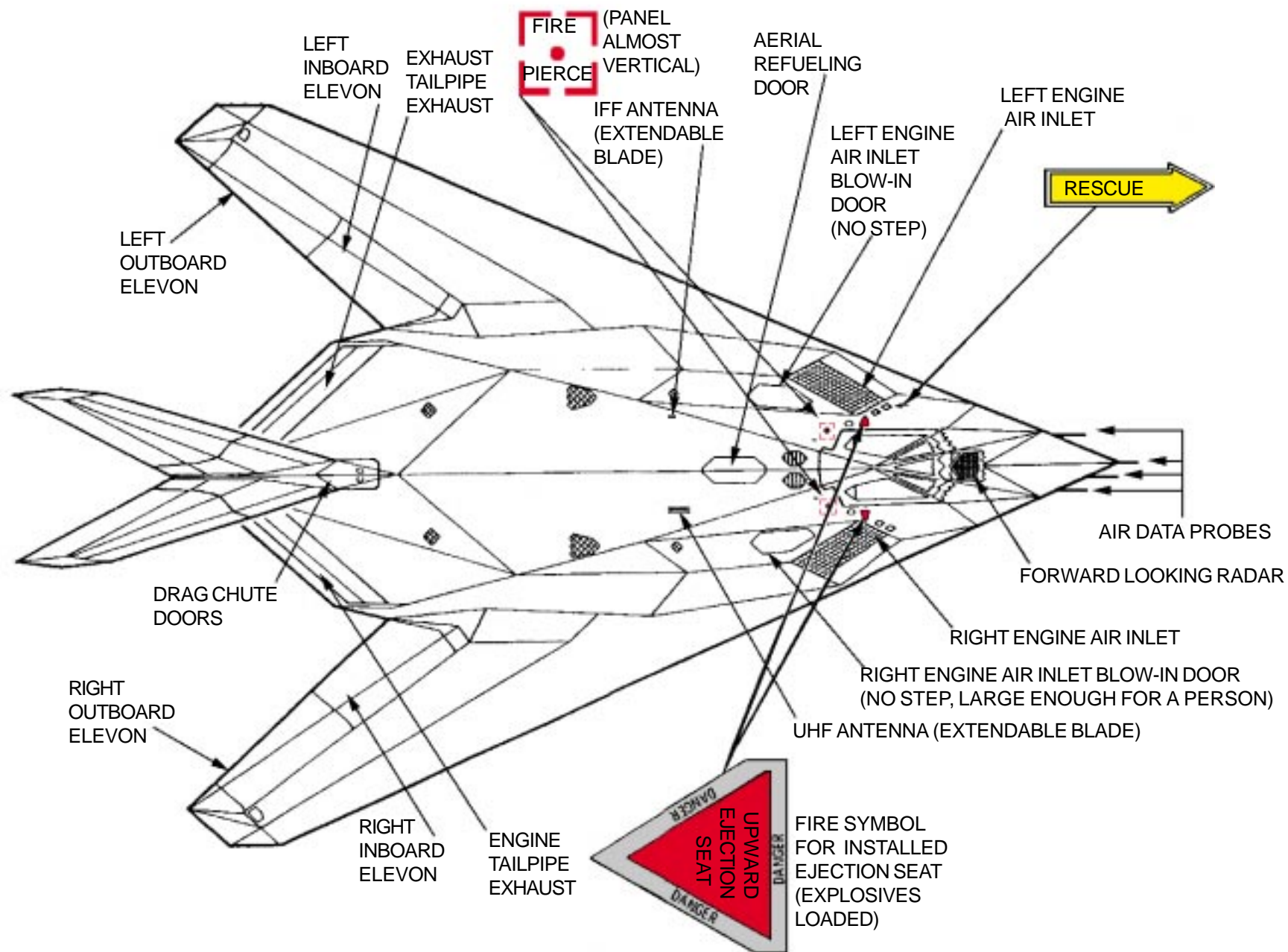
F-117A



# AIRCRAFT HAZARDS

TOP VIEW

F-117A



# AIRCRAFT HAZARDS-Continued

## LEFT AND RIGHT SIDE VIEWS

### NOTE:

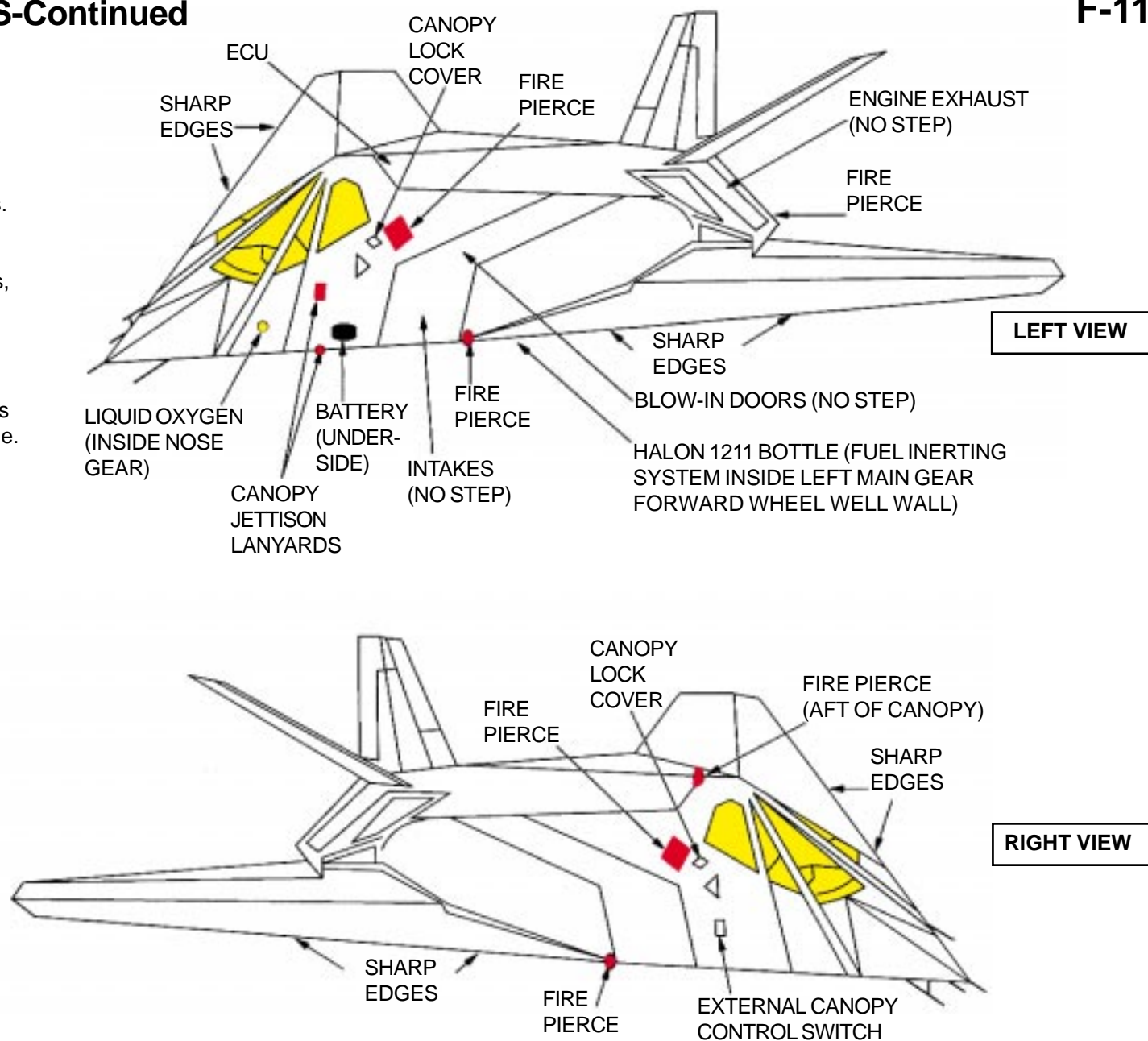
5 Gallons of Alcohol are located behind the Environmental Control Unit (ECU) (Served in the bomb bay. These areas are fire sources.

### NOTE:

No Step Areas are Engine Intakes, Engine Exhaust and Inlet Blow In Doors.

### NOTE:

The aircraft can have 2,000 pounds of munitions/weapons on each side.



F-117A

**SPECIAL TOOLS/EQUIPMENT**

Power Rescue Saw or equivalent  
 Rescue Ladder for left side  
 Rescue Ladder for right side  
 1/2 In. Dr. Speed Handle with 1/2 In. Socket  
 6 In. X 1/2 In. Extension  
 Canopy Unlock Tool  
 Extraction Kit  
 Hydraulic Power Rescue Tool  
 Ballistic Hose Dearthm Cutter  
 AT501C or equivalent  
 Modified Bayonet Nozzle  
 Fire Drill II

**AIRCRAFT ENTRY****NOTE:**

Electric drills or pneumatic tools will not be used to manually raise the canopy. This unauthorized procedure will damage the canopy raising/lowering mechanism.

**NOTE:**

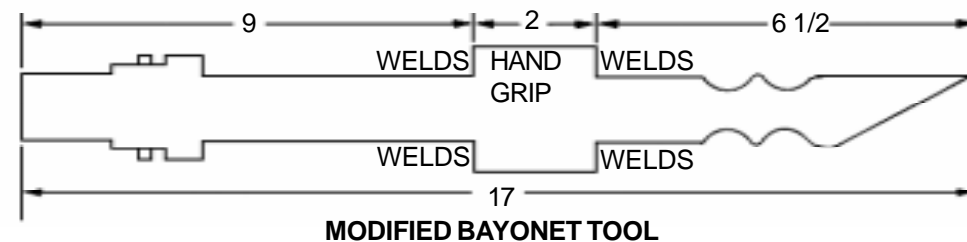
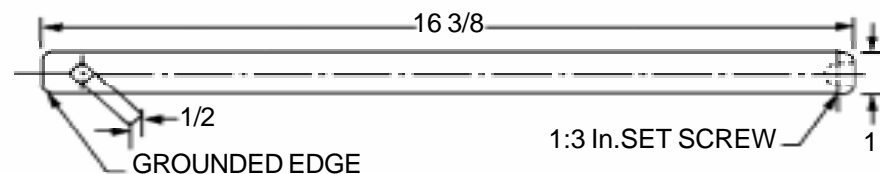
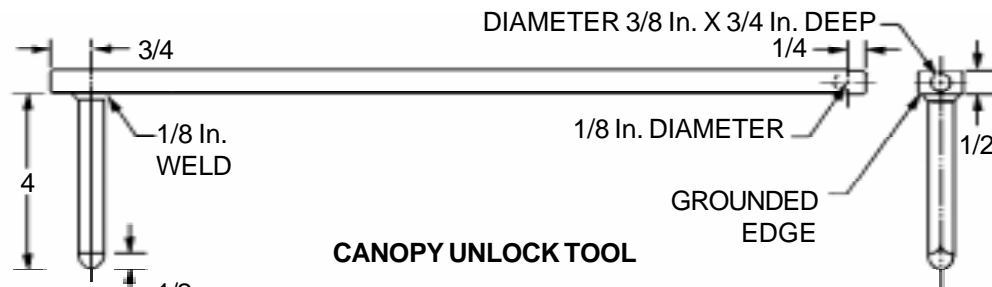
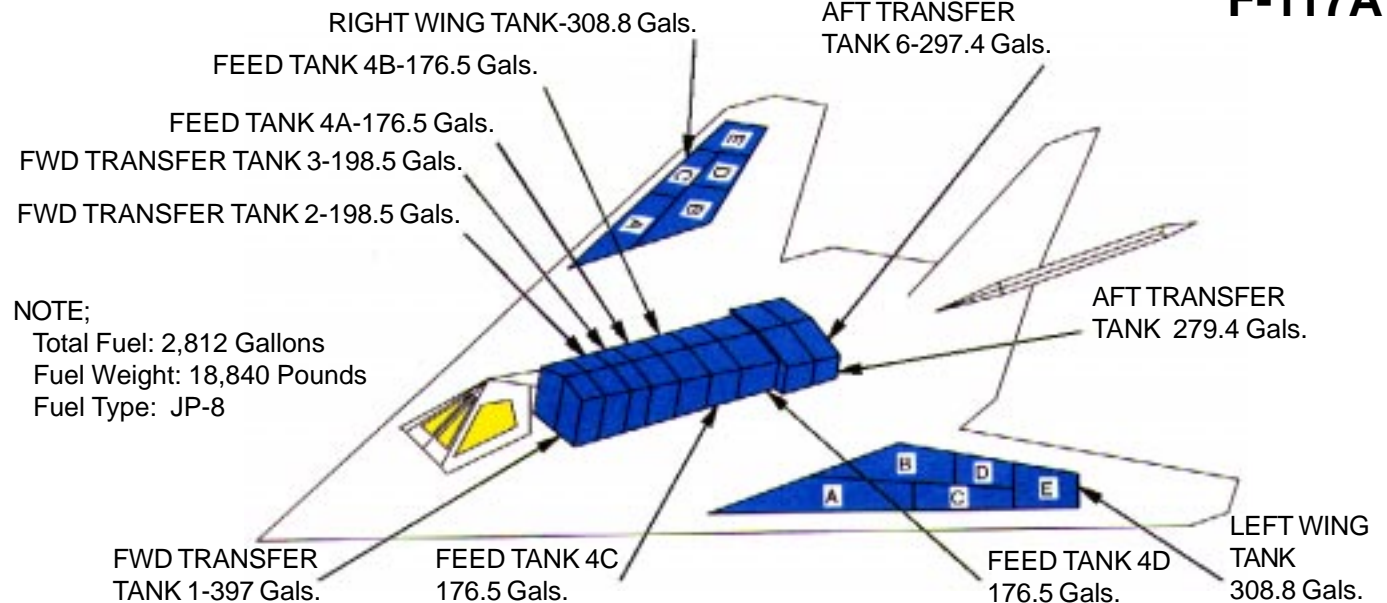
Primary communication hook-up is made by using the connection located in the nose gear compartment. However, the main gear compartments also have hook-ups.

**NOTE:**

The F-117A does not use a canopy strut or prop support for the aircraft canopy. A temporary prop may be used as an aid during rescue and extraction procedures.

**NOTE:**

The special tools (Canopy Unlock Tool and Modified Bayonet Tool) illustrated at the right are locally manufactured. All dimensions are measured in inches.





# AIRCRAFT ENTRY-Continued

F-117A

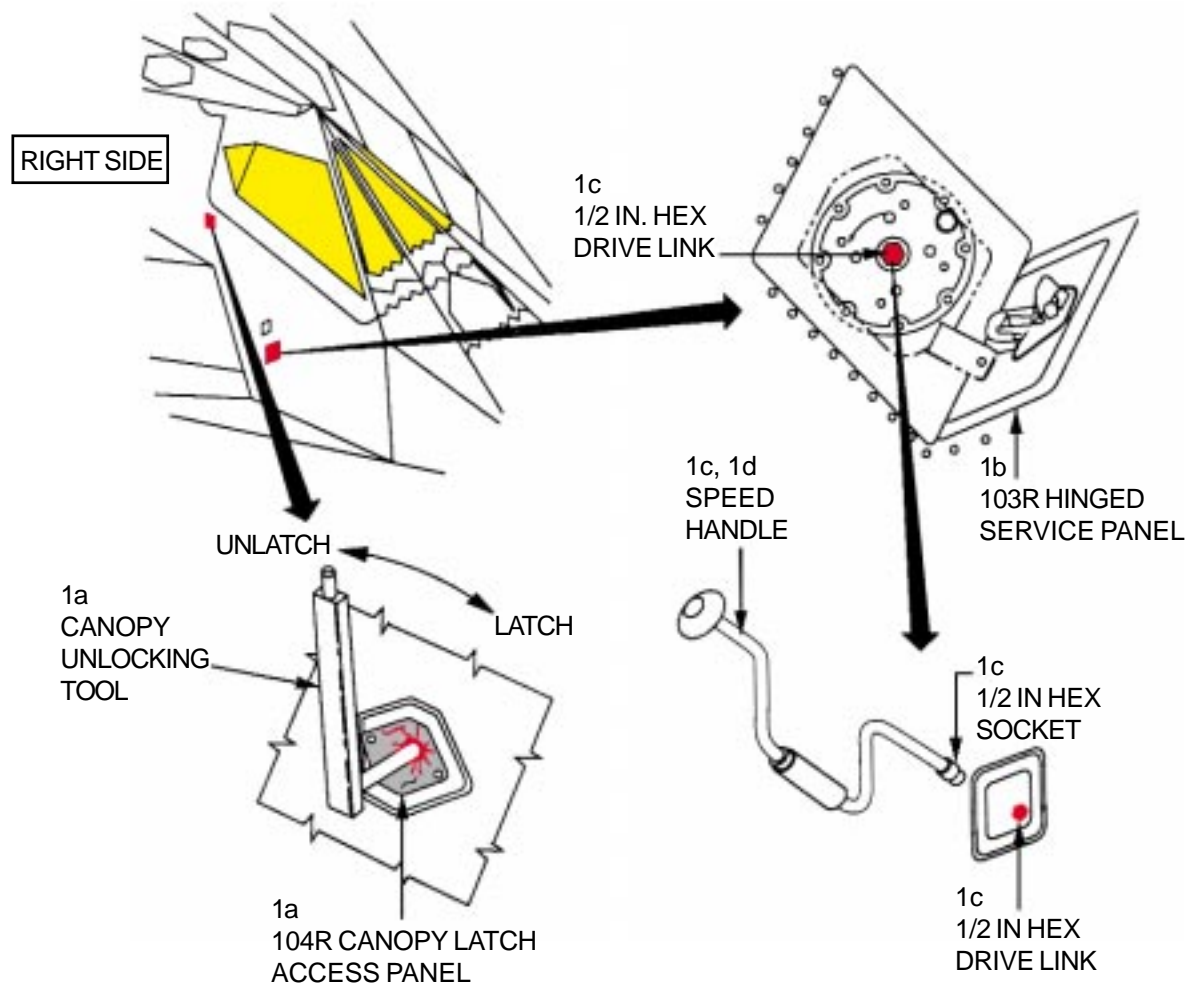
## 1. MANUAL ENTRY

- Punch through 104R canopy latch access panel with canopy unlocking tool. Rotate tool 90 degrees counterclockwise to unlock canopy. (Canopy may be unlocked from left side in the same manner by rotating handle 90 degrees clockwise.)
- Press latch to open 103R hinged service panel.
- Insert speed handle with socket attached (extension necessary when working from ladder) and place on 1/2 inch hex drive link located in center of opening.
- Crank speed handle 322 turns counterclockwise to raise canopy.

### NOTE:

If canopy actuator motor crank fails, canopy can be opened if pilot is conscious by performing the following:

- 1) Unlock canopy with canopy unlocking tool.
- 2) Have pilot remove left and right canopy actuator pins.
- 3) Pry open canopy with pry bar to gain hand hold.
- 4) Lift canopy to full-open position.
- 5) Canopy may either be raised to shear hinges and pushed over side or locked open with canopy props depending upon situation. (At least two people are required for lifting canopy.)



# AIRCRAFT ENTRY-Continued

F-117A

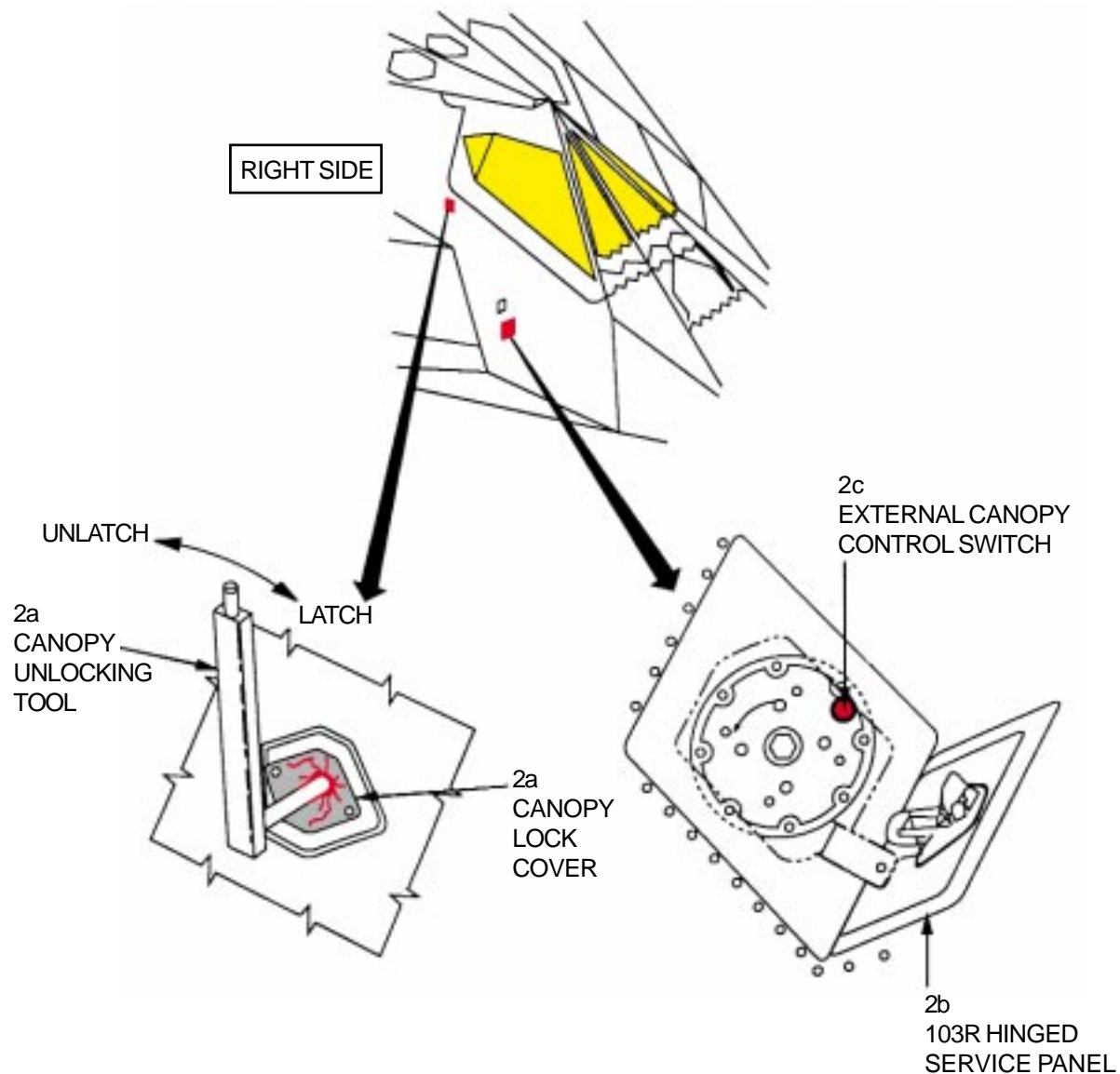
## 2. NORMAL ENTRY

- a. Access from right side is illustrated for these procedures. Punch through canopy lock cover, located right or left side of fuselage below aft portion of canopy, with canopy unlocking tool. Rotate tool 90 degrees counterclockwise to unlock canopy. (Canopy may be unlocked from left side in same manner, by rotating handle 90 degrees clockwise.)

### NOTE:

If the canopy external unlocking latch is damaged on both sides of aircraft from impact, electrical and manual methods of raising canopy will not be possible. Under these conditions, cut-in method should be used.

- b. Press latch to open 103R hinged service panel.
- c. Turn and hold external canopy control switch in OPEN position to raise canopy.



# AIRCRAFT ENTRY-Continued

F-117A

## 3. EMERGENCY ENTRY

WHEELS UP

### WARNING

Canopy will not eject if open over eight inches. Do not jettison canopy if canopy and cockpit have been damaged from impact. If canopy is jettisoned under these conditions, pilot may suffer severe injury and/or death.

- a. Press latch to open 103L hinged service panel. Remove T-handle and lanyard.

### CAUTION

Ensure area is clear to side and aft of cockpit before jettisoning canopy.

- b. Extend lanyard and T-handle to full length and pull hard to jettison canopy.

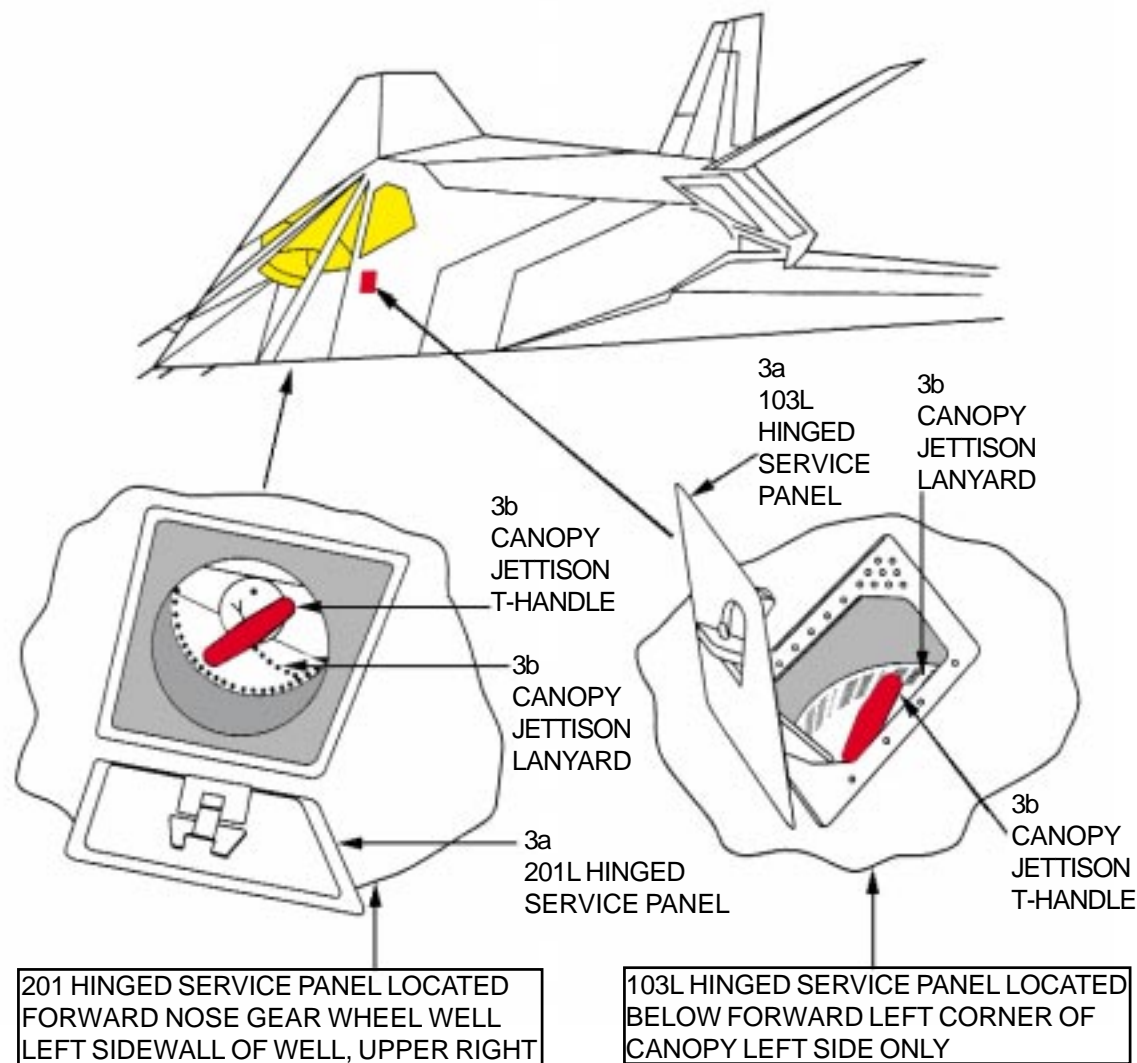
WHEELS DOWN

- a. Press latch to open 103L or 201L hinged service panel. Remove T-handle and lanyard.

### CAUTION

Ensure area is clear to side and aft of cockpit before jettisoning canopy.

- b. Extend lanyard and T-handle to full length and pull hard to jettison canopy.



## AIRCRAFT ENTRY-Continued

F-117A

### 4. CUT-IN

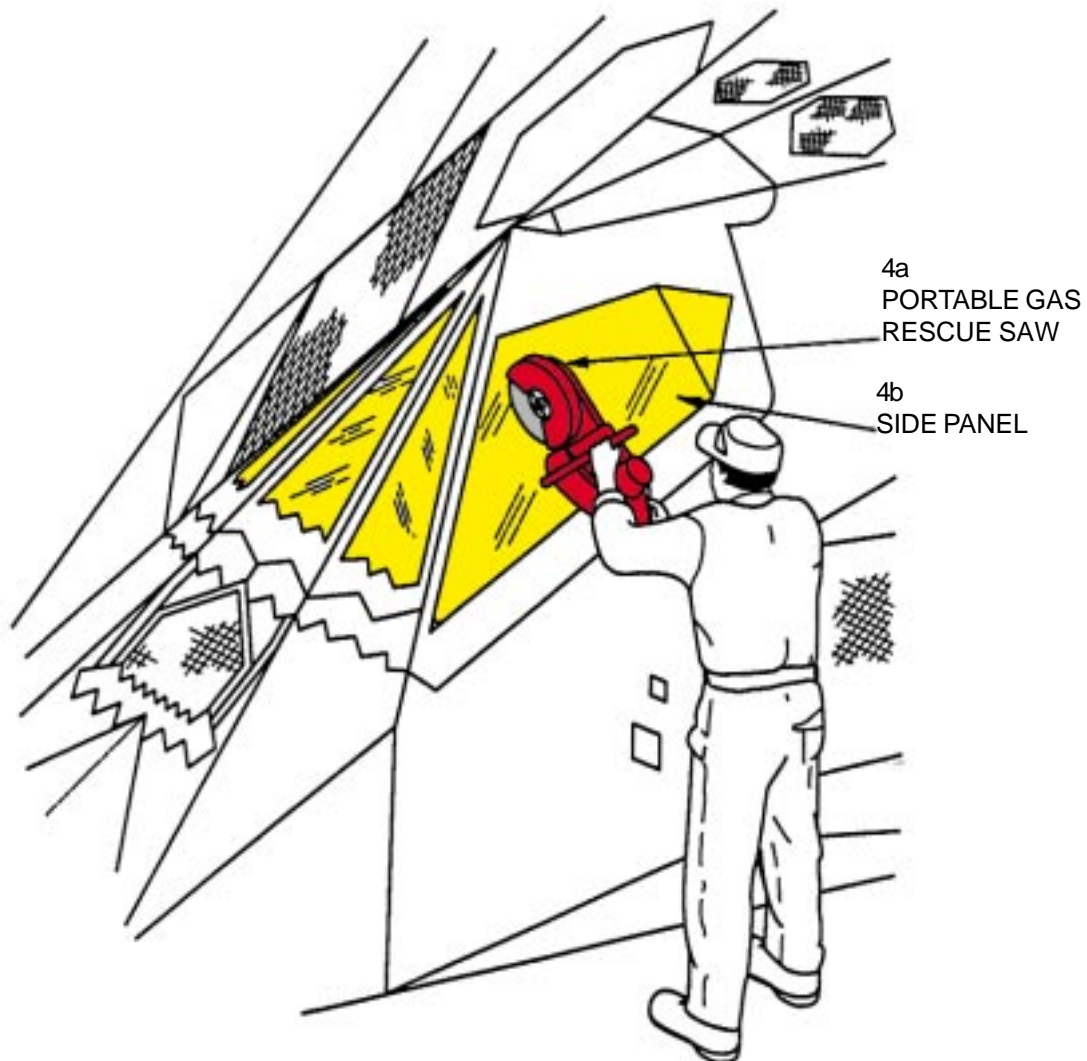
**WARNING**

Do not use portable gas rescue saw in an explosive atmosphere. This may cause an explosive and/or fire resulting in injury or death to pilot and rescue personnel.

- a. Using portable gas rescue saw, cut out left or right side panel by cutting along inside edge of canopy frame on all four sides of panel.
- b. Lift out panel.

**NOTE:**

Use 12 inch diameter metal blade with carbide tip, 3 and 1/8 inch pitch.





# ENGINE SHUTDOWN

## 1. ENGINE SHUTDOWN

### NOTE:

Throttles cannot be retarded simultaneously.  
Throttles must be retarded one at a time.

- a. Raise finger lifts, raise throttles located on left console and move aft to OFF position.

### NOTE:

The INERT switch is used to make the fuel system inert by using Halon 1211. Halon 1211 is not used to extinguish fire.

- b. Set INERT switch on left console forward of throttles to ON.

### NOTE:

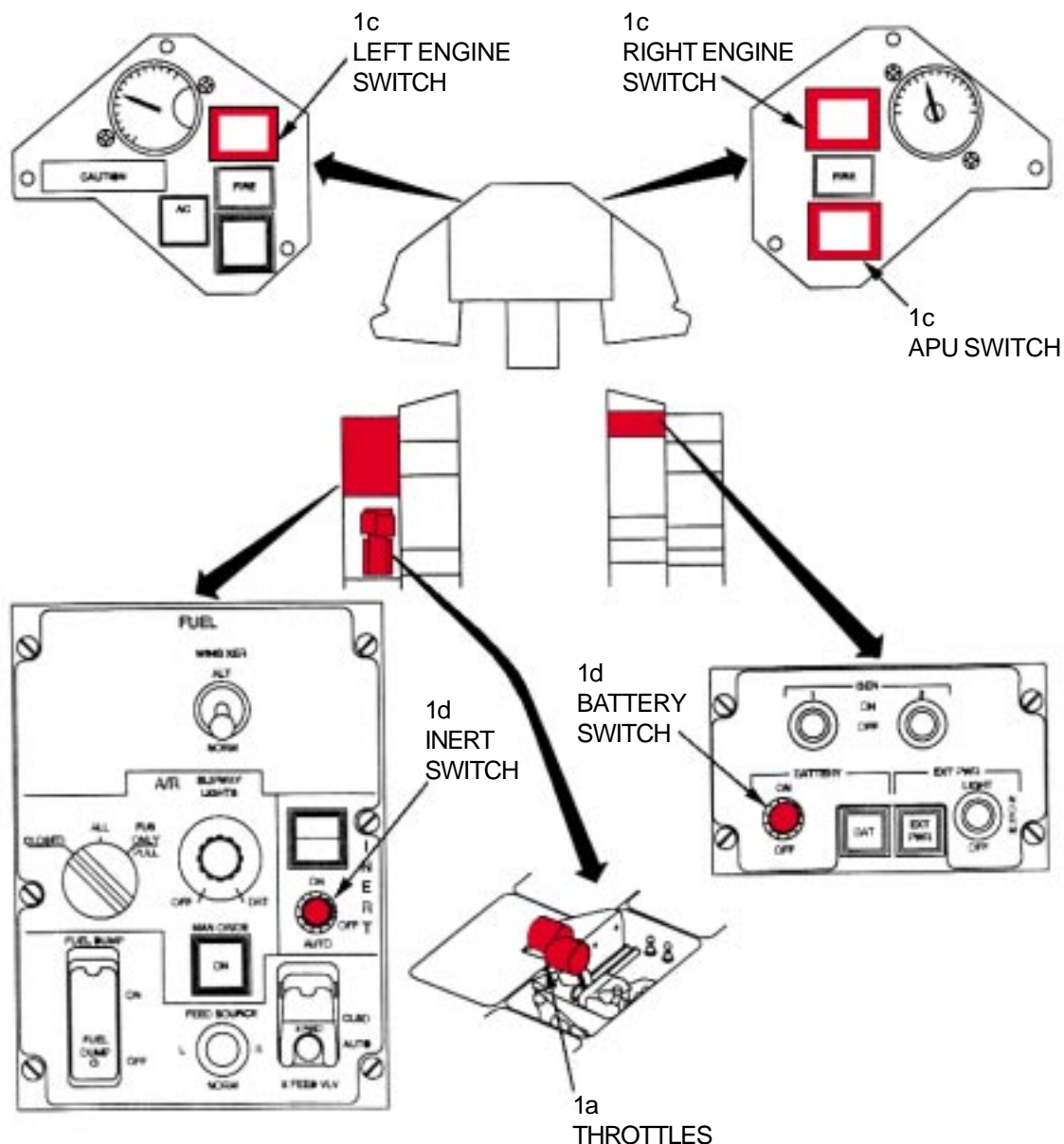
Ensure that the engine and APU switches are touched only once. Subsequent touching will cause firewall shutoff valves to reopen.

- c. Touch left engine, right engine and APU switches to ensure that fuel flow is shutoff.

### NOTE:

- If fuel fails to stop, manual fuel shutoff valves are located in the forward section of the main landing gear well.
- BATTERY switch must be turned off last. Wait one or two seconds after step c. is performed before setting BATTERY switch to OFF to allow time for firewall shutoff valves to close electrically.

- d. Set BATTERY switch on right console to OFF.



F-117A

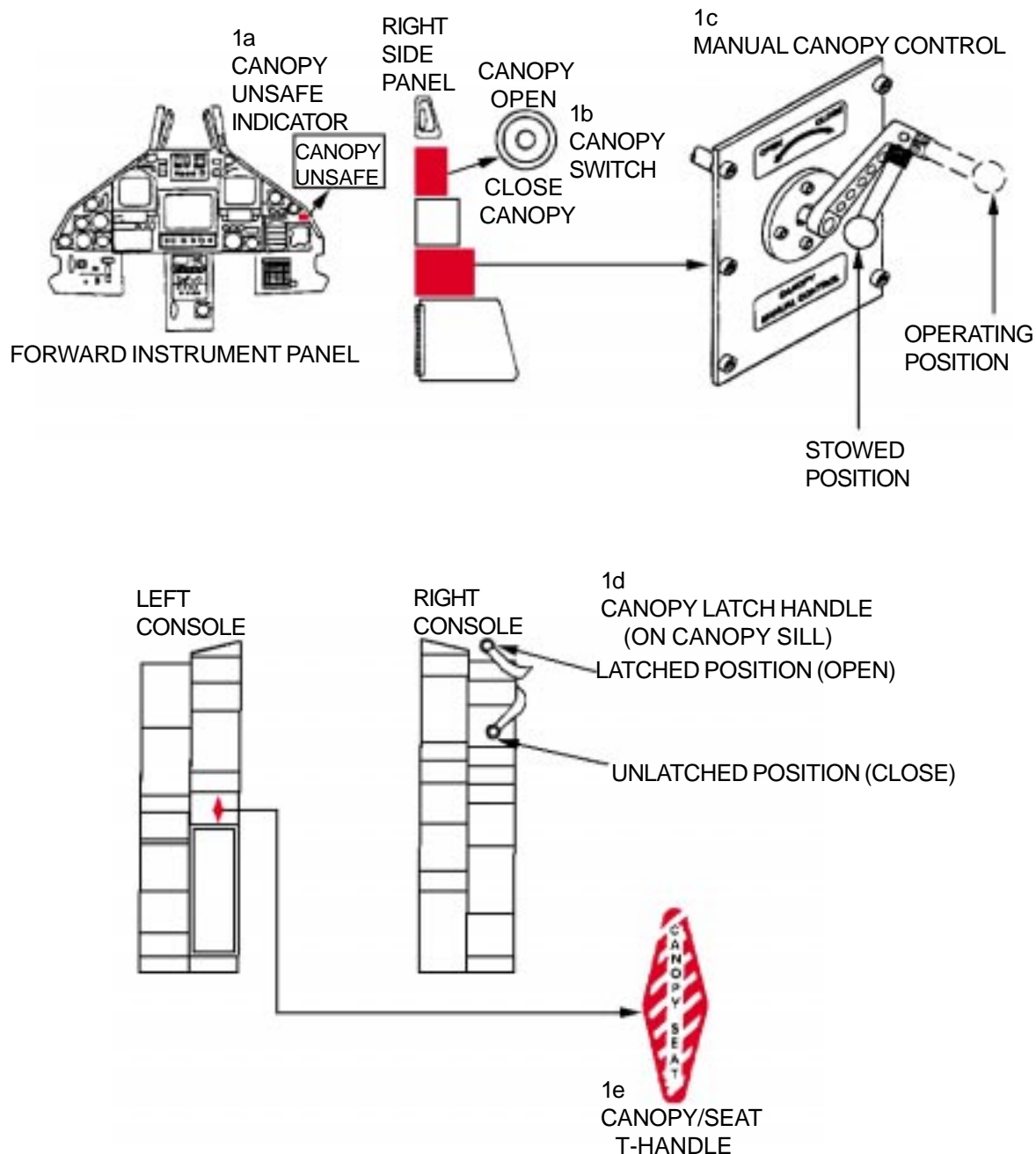
# INTERNAL CANOPY CONTROLS

## 1. INTERNAL CANOPY CONTROLS

- a. Canopy Unsafe indicator is located on the forward instrument panel right corner. This indicator will illuminate when the canopy is unlatched (unlocked) or ajar.
- b. Canopy Open/Close switch is located on the right side panel. Move switch up for open, down for close.
- c. Canopy Manual Control is located on the right side panel. Handle must be pulled out of the stowed position to operate. This handle must be rotated clockwise to manually open the canopy and counterclockwise to manually close the canopy.
- d. Canopy Latch Handle is located on the canopy sill above the right console. Handle must be moved forward to latch (lock) the canopy and moved aft to unlatch (unlock) the canopy.
- e. Canopy/Seat T-Handle is located on the left console. This handle provides the pilot with the capability of jettisoning only the canopy without firing the ejection seat. When the T-handle is pulled straight up, the canopy will jettison. The T-handle requires an approximate 12 to 15 pound pull for the first 3/8 inch of travel to take up slack present in the lines. The handle then requires a 50 pound pull over one inch of travel to actuate the canopy jettison initiator. If the T-handle is turned 90 degrees counterclockwise after the canopy is jettisoned and pulled up further, **seat ejection will occur**. The T-handle will separate in the pilot's hand to prevent injury during the ejection.

### WARNING

**The seat will eject even if the Ground Safety Lock is rotated forward in the Safe Position if the Canopy/Seat T-handle is pulled!**



F-117A

# SAFETYING EJECTION SYSTEM AND AIRCREW EXTRACTION

## 1. EJECTION SYSTEM

### NOTE:

The Advanced Concept Ejection System (ACES II) can be identified by pitot airspeed sensing inlet tubes at top of seat and two ejection control handles. DO NOT USE PITOTS AS A HAND HOLD FOR GAINING COCKPIT ENTRY.

- Rotate Ground Safety Lever, located left side of seat directly aft of the Ejection Control Handle, UP and FORWARD.
- Install Safety Pin inboard in left Ejection Control Handle.
- Install Safety Pin in the Canopy/Seat T-Handle.

### NOTE:

Do not use Emergency Manual Chute Handle. Actuation of this handle will cause pilot chute to deploy only after ejection. It does not release restraints.

- Install Safety Pin (if time allows) in Emergency Manual Chute Handle. BEWARE OF INTANGLING.

## 2. AIRCREW EXTRACTION

### NOTE:

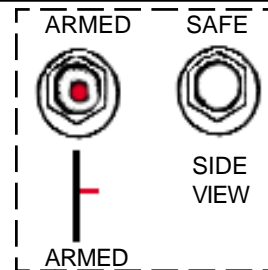
If seat has been damaged by fire or impact, ballistic hoses must be cut with disarming tool. If aircraft lands with all wheels up, or nose wheel up, pilot may have suffered severe back and/or neck injuries. In these situations, Kendrick Extraction Kit must be used to avoid causing further injuries that could disable or kill pilot. If possible, rescue should not be effected until pilot is secured in Kendrick device.

- Release lap belt buckle. Insert thumb into fitting, push cover up and roll serration bar downward with thumb to release.
- Release left and right survival kit buckles.
- Release left and right shoulder harness fittings. Insert thumb into fitting, push cover up and roll serration bar downward with thumb to release.
- Disconnect personnel leads: communication, oxygen hose, and "G" suit hose, if applicable.

### NOTE:

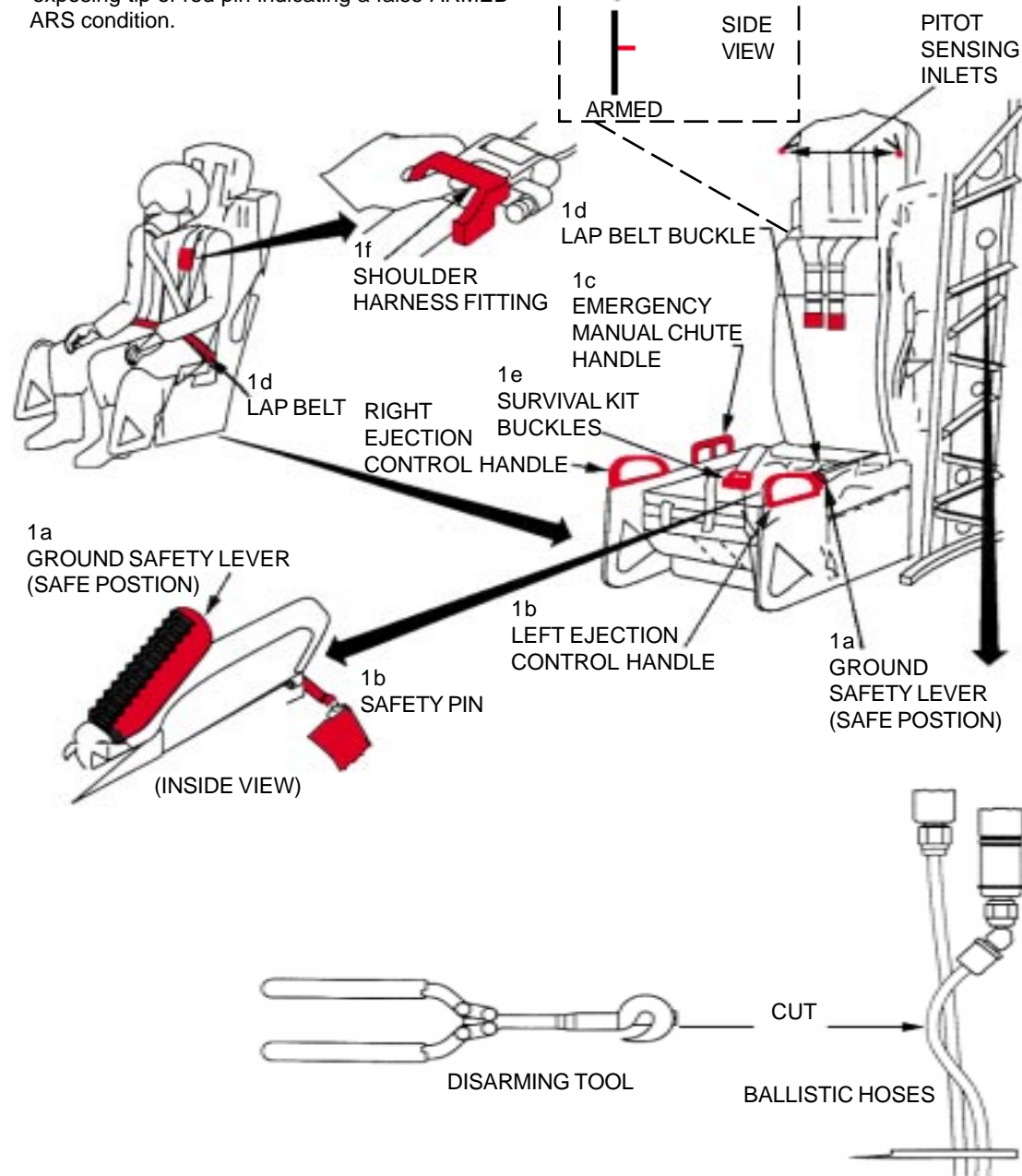
Do not touch indicator sealant when checking condition. Frequent touching wears off sealant exposing tip of red pin indicating a false ARMED ARS condition.

### ARS INDICATOR



F-117A

T.O. 00-105E-9



**NOTE**

Chapter 9 contains emergency rescue and mishap response information for the following aircraft:

<b>USAF</b>	<b>UH-1N</b>
<b>USAF</b>	<b>CH-3E</b>
<b>USAF</b>	<b>HH-1H</b>
<b>USAF</b>	<b>MH-53J</b>
<b>USAF</b>	<b>MH-60G</b>
<b>USAF</b>	<b>V-22</b>



## CHAPTER 9

### U.S. AIR FORCE

### HELICOPTER

#### AEROSPACE EMERGENCY RESCUE AND MISHAP RESPONSE INFORMATION

##### 9-1. INTRODUCTION AND USE.

9-2. This section contains emergency rescue and mishap response information illustrations in alpha-numerical order relative to type and model of aircraft. This arrangement of illustrations is maintained from Chapter 4 throughout the remainder of the publication.

##### 9-3. GENERAL ARRANGEMENT.

9-4. Aircraft type designation has been positioned in the upper right corner of the horizontal illustration for rapid identification. Additional aids to rapid orientation are:

a. Recent technological advances in aviation have caused concern for the modern firefighter. Aircraft hazards, cabin configurations, airframe materials, and any other information that would be helpful in fighting fires, the locating and rescue of personnel will be added as the information becomes available.

b. Suggested special tools/equipment are listed in the upper left corner, on the Aircraft/Entry page of each listed aircraft.

c. Procedural steps covering emergency/normal entrances, cut-ins, engine/APU shutdown, safetying ejection/escape systems, and aircrew extraction are outlined on the left side of each page with coordinated illustrations on the right.

d. Illustrations located on right side of pages are coordinated with text by numerals and small letters depicting both paragraph and subparagraph on the page.

e. Each illustration is consistently colored and/or pattern keyed to highlight essential emergency rescue information.

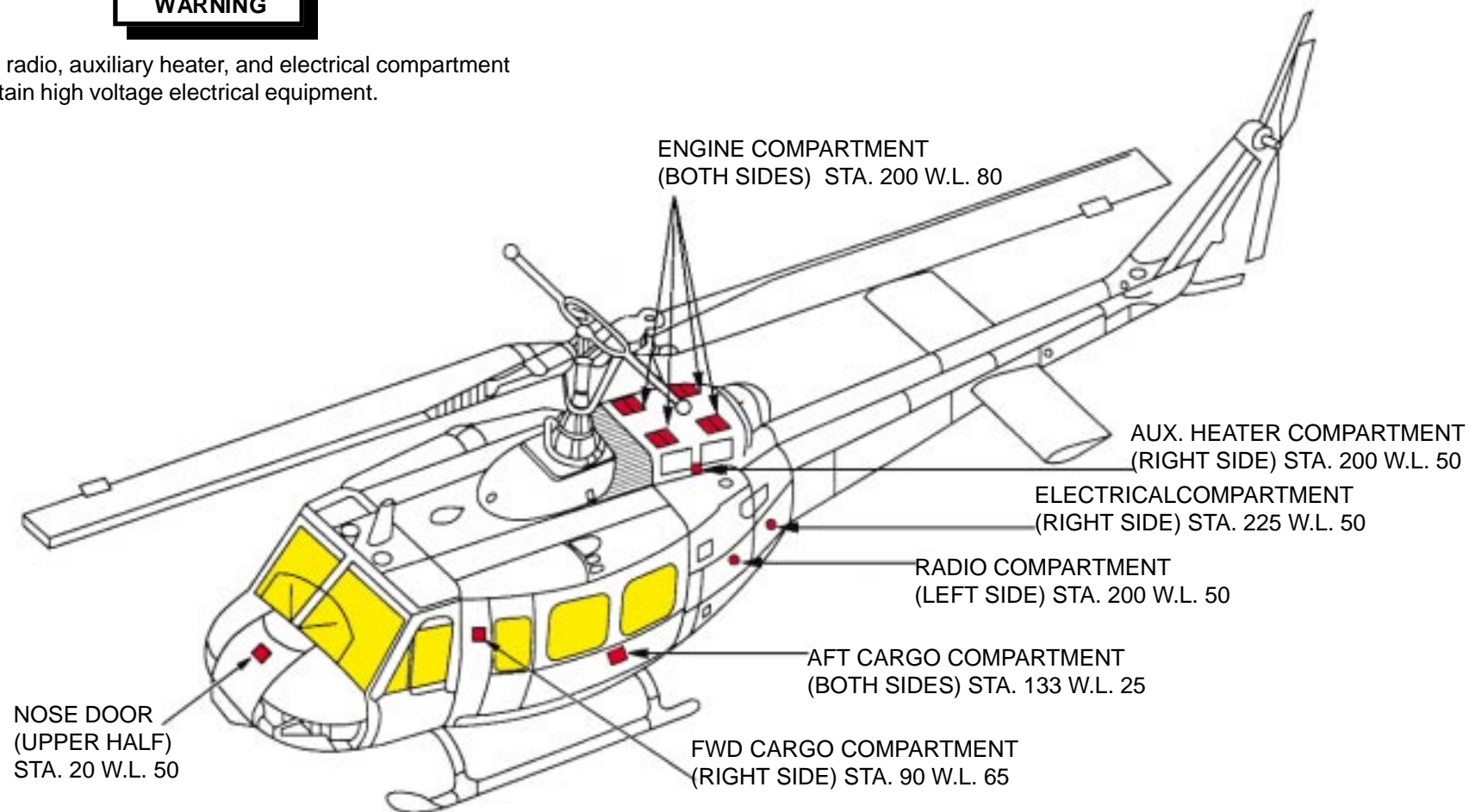
f. Details are pulled directly from the illustration to highlight an area, thus eliminating unnecessary searching for desired information.

# AIRCRAFT SKIN PENETRATION POINTS

UH-1N

**WARNING**

The radio, auxiliary heater, and electrical compartment contain high voltage electrical equipment.



## SPECIAL TOOLS/EQUIPMENT

Power Rescue Saw

UH-1N

## AIRCRAFT ENTRY

**WARNING**

Caution must be exercised when entering rotor blade area. Entry must be from side of aircraft.

## 1. NORMAL ENTRY

- Rotate crew door handle, located left and right forward fuselage, counterclockwise to unlatch door. Pull out and forward to open position.
- Pull passenger-cargo door handle, located left and right fuselage, down to unlatch and release door. Slide door aft to open position.

## 2. EMERGENCY ENTRY

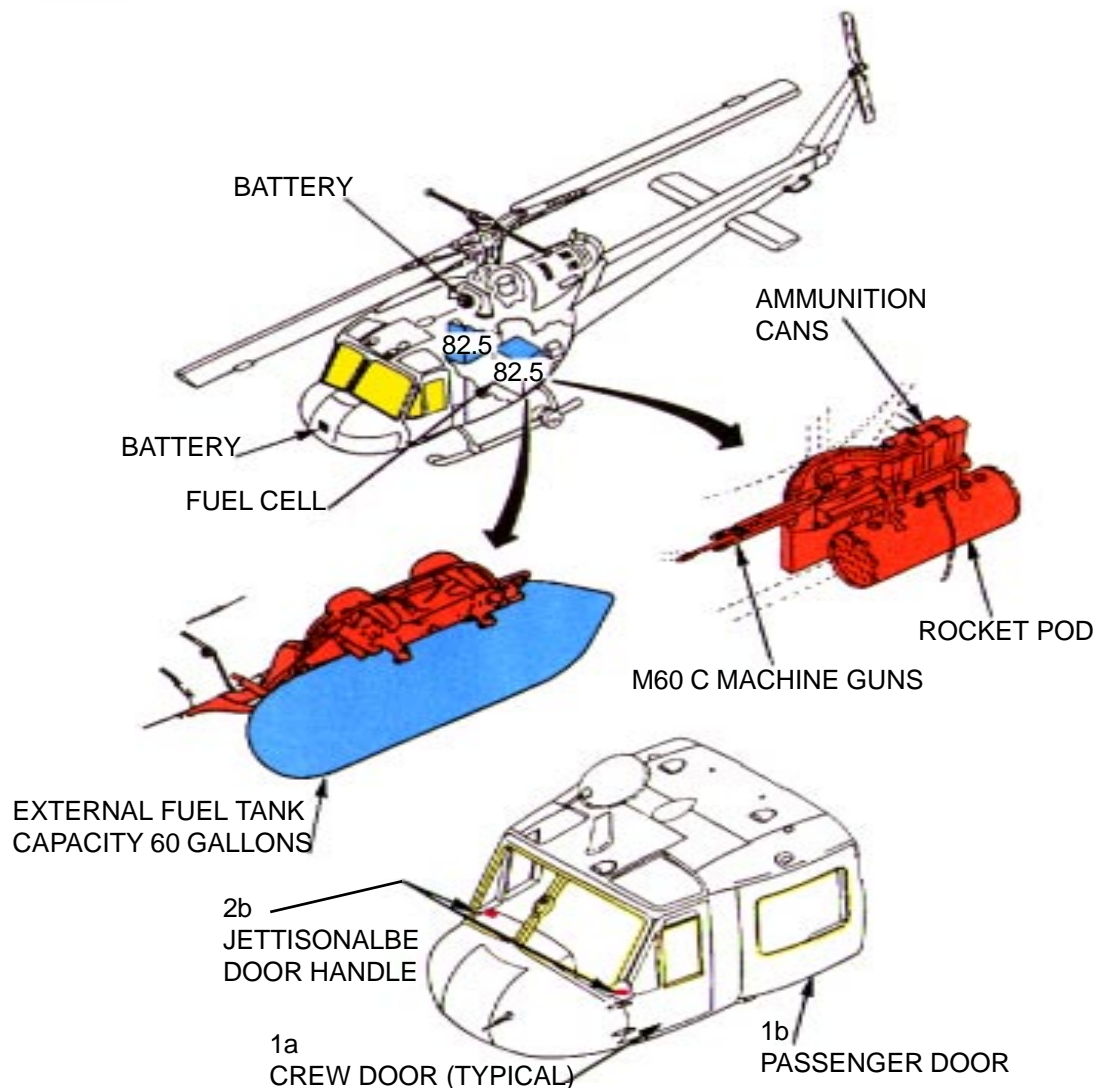
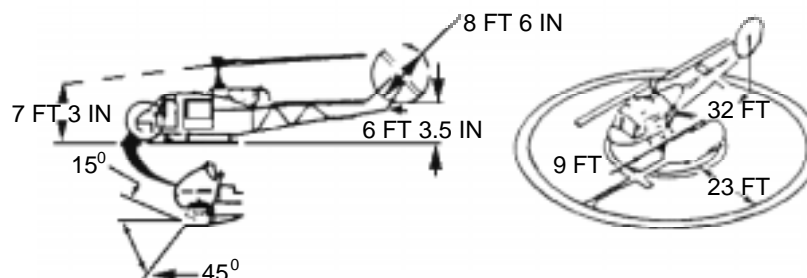
- Slide, break or cut crew door window, located left and right forward fuselage.
- Reach inside door and pull emergency release handles, located forward of right and left crew door frames, aft to release doors.
- Pull doors outward and place away from exits.

## 3. CUT-IN

- Cut plastic windows and glass windshield to gain entry.

## NOTE:

If helicopter has internal auxiliary tanks - fuel capacity is 50 - 60 gallons. If cargo auxiliary tank is installed - 350 gallons.



# ENGINE SHUTDOWN AND AIRCREW EXTRACTION

## 1. ENGINE SHUTDOWN

- Pull fire T-handles, located upper center instrument panel. (UH-1N only- twin engine only)
- Place fuel switches, located on pedestal console, to OFF position.

### WARNING

For VIP models only. Do not apply rotor brake above 130 RPM. Doing so could cause brake disc failure resulting in uncontrolled movement of the aircraft or disintegration of the brake disc. Application of the rotor brake when the aircraft is on ice may also result in uncontrolled movement.

- Apply rotor brake (if installed), located overhead on right side of cabin roof, down and forward to lock.
- Turn battery switch to OFF position.

## 2. AIRCREW EXTRACTION

### NOTE:

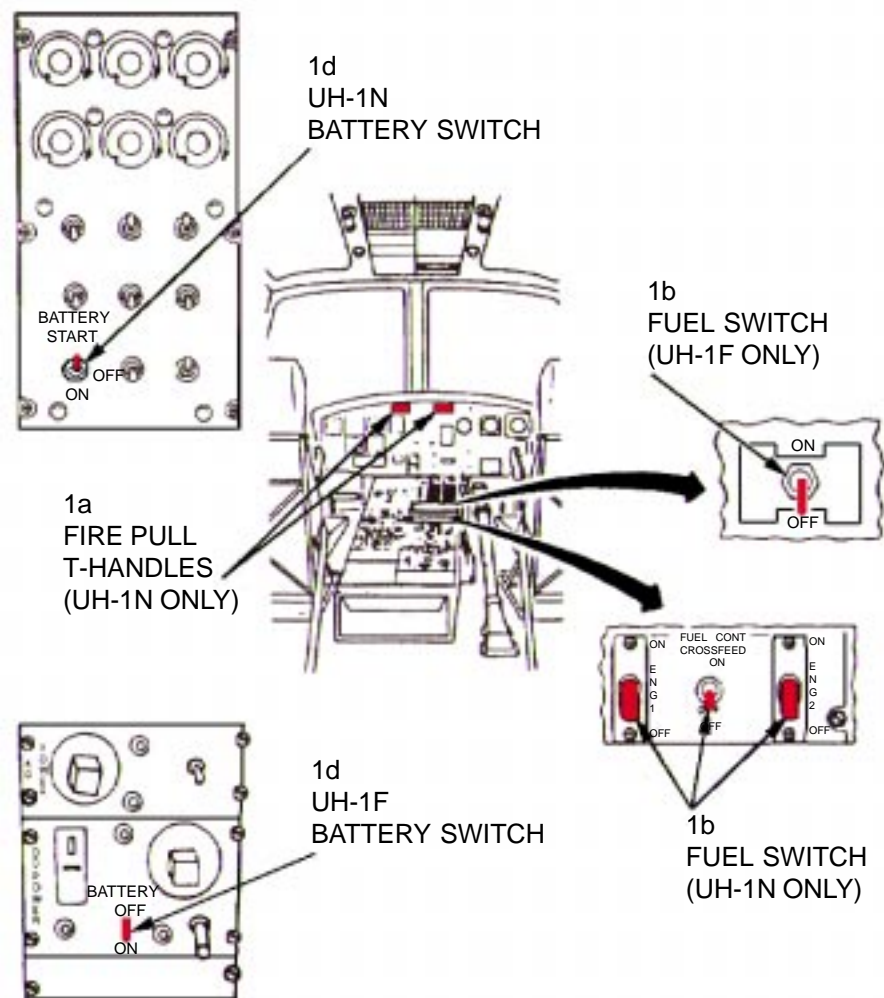
Aircrew seats are equipped with shoulder harness and lap belts. Troop seats are equipped with lap belts only.

- Unlatch lap belts and remove shoulder harness from crewmembers.

### NOTE:

Red handles under each seat can be pulled down ward to tilt seat backward. Seat is very heavy, hand assist seat back is necessary.

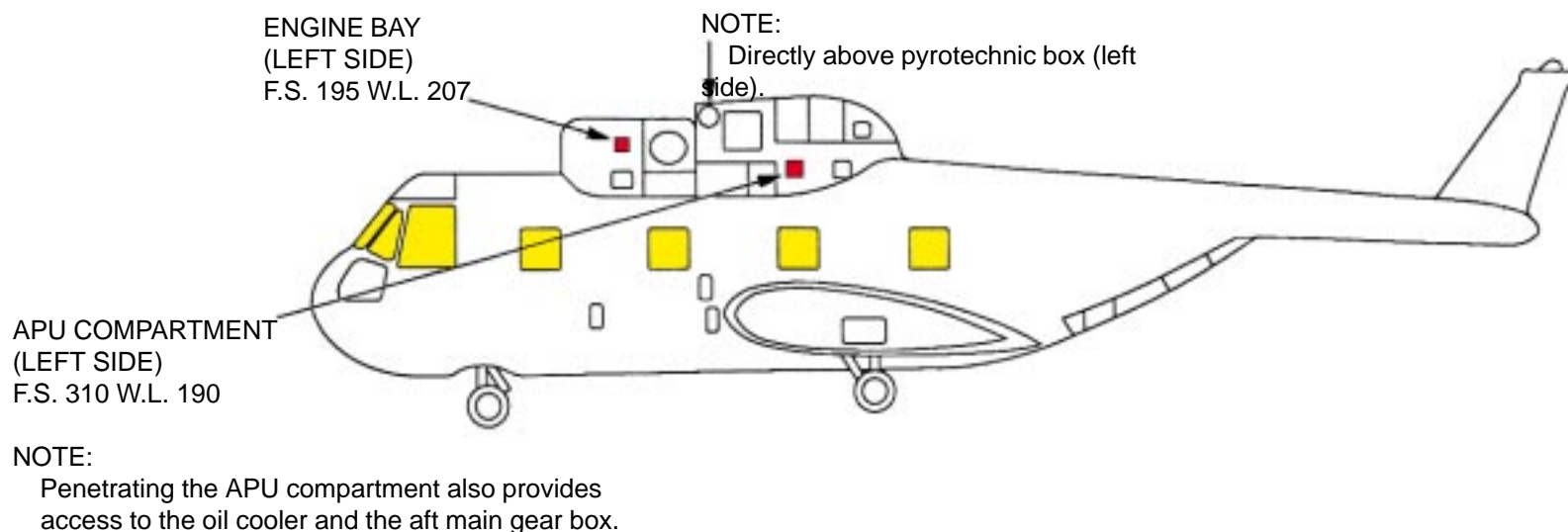
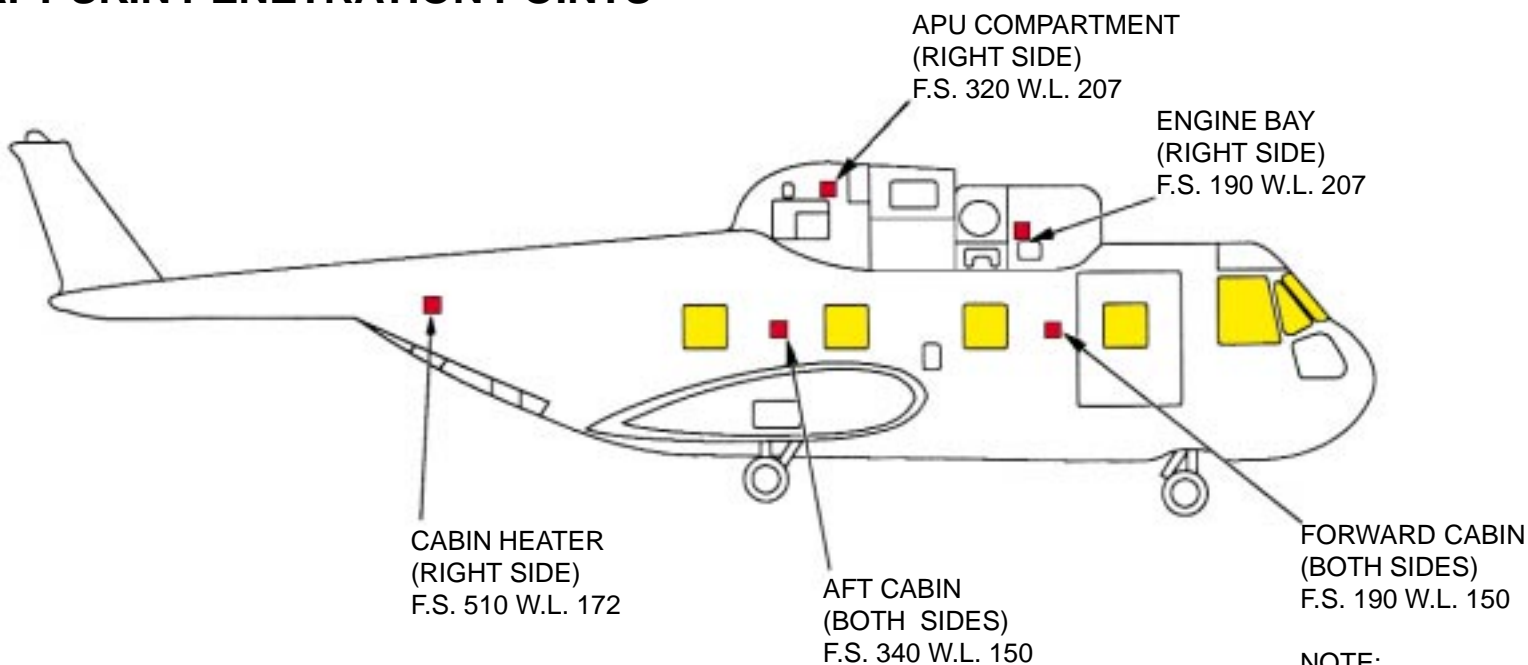
- Unlatch lap belts from passengers (if applicable).










# AIRCRAFT SKIN PENETRATION POINTS

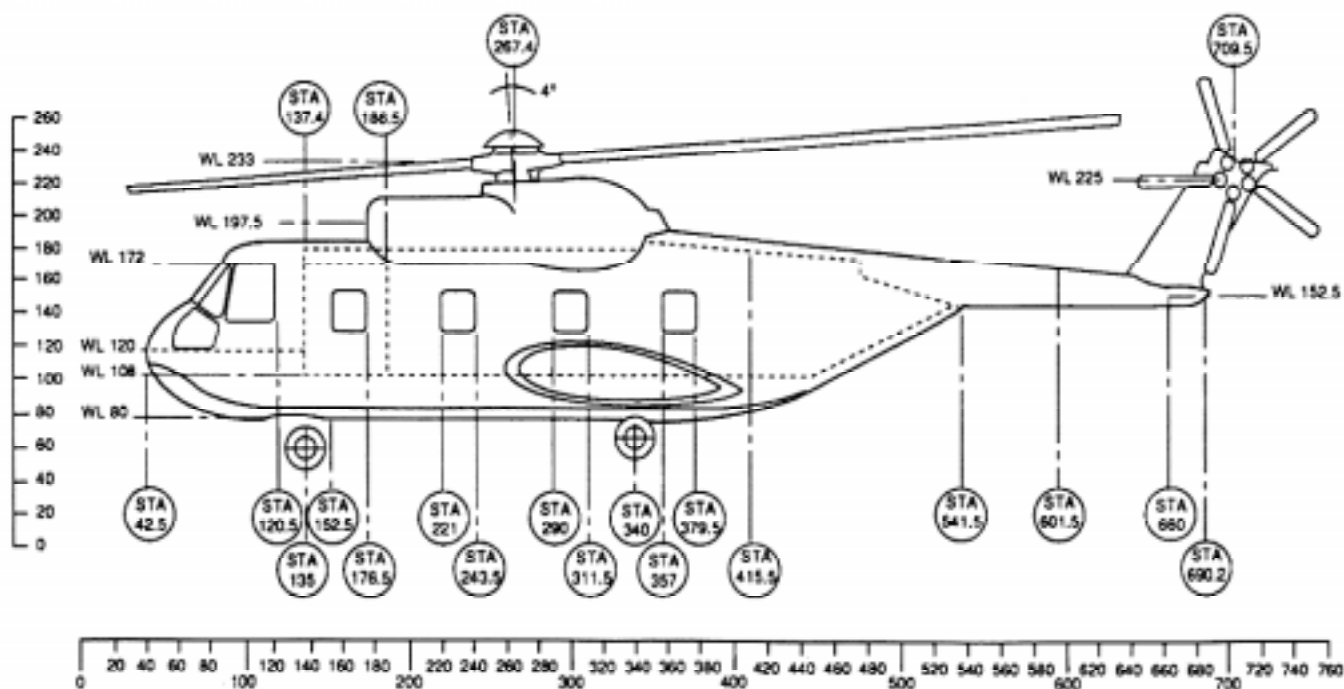
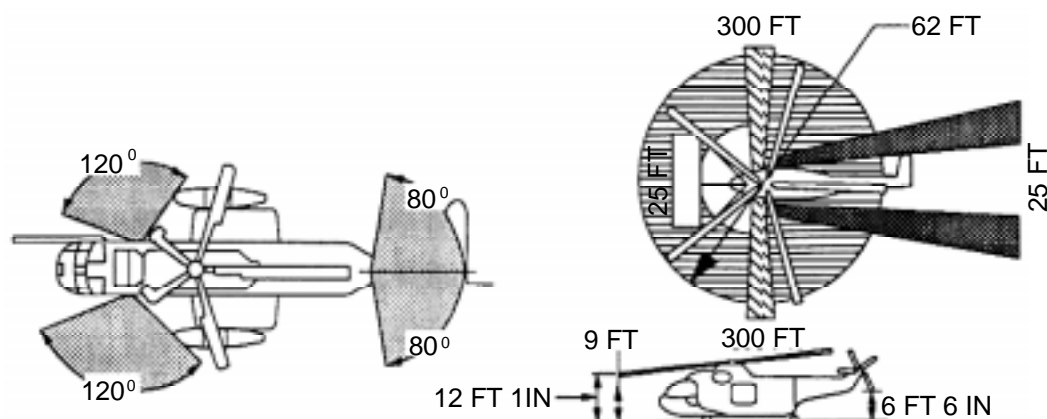
CH-3E



# AIRCRAFT HAZARDS

CH-3E

-  STARTER/TURBINE DISINTEGRATION AREA
-  ROTOR BLADE DANGER AREA
-  VERY HIGH FREQUENCY FAN NOISE, VIBRATION AND INGESTION
-  ENGINE EXHAUST - TEMPERATURE
-  GUN MUZZLE AREA - INDICATES AREA WHERE A MAXIMUM DEPRESSION UP OF -30 DEGREES IS ESTABLISHED TO MISS THE EXTERNAL AUXILIARY FUEL TANKS



# SPECIAL TOOLS/EQUIPMENT

## Power Rescue Saw

### AIRCRAFT ENTRY

#### 1. NORMAL ENTRY

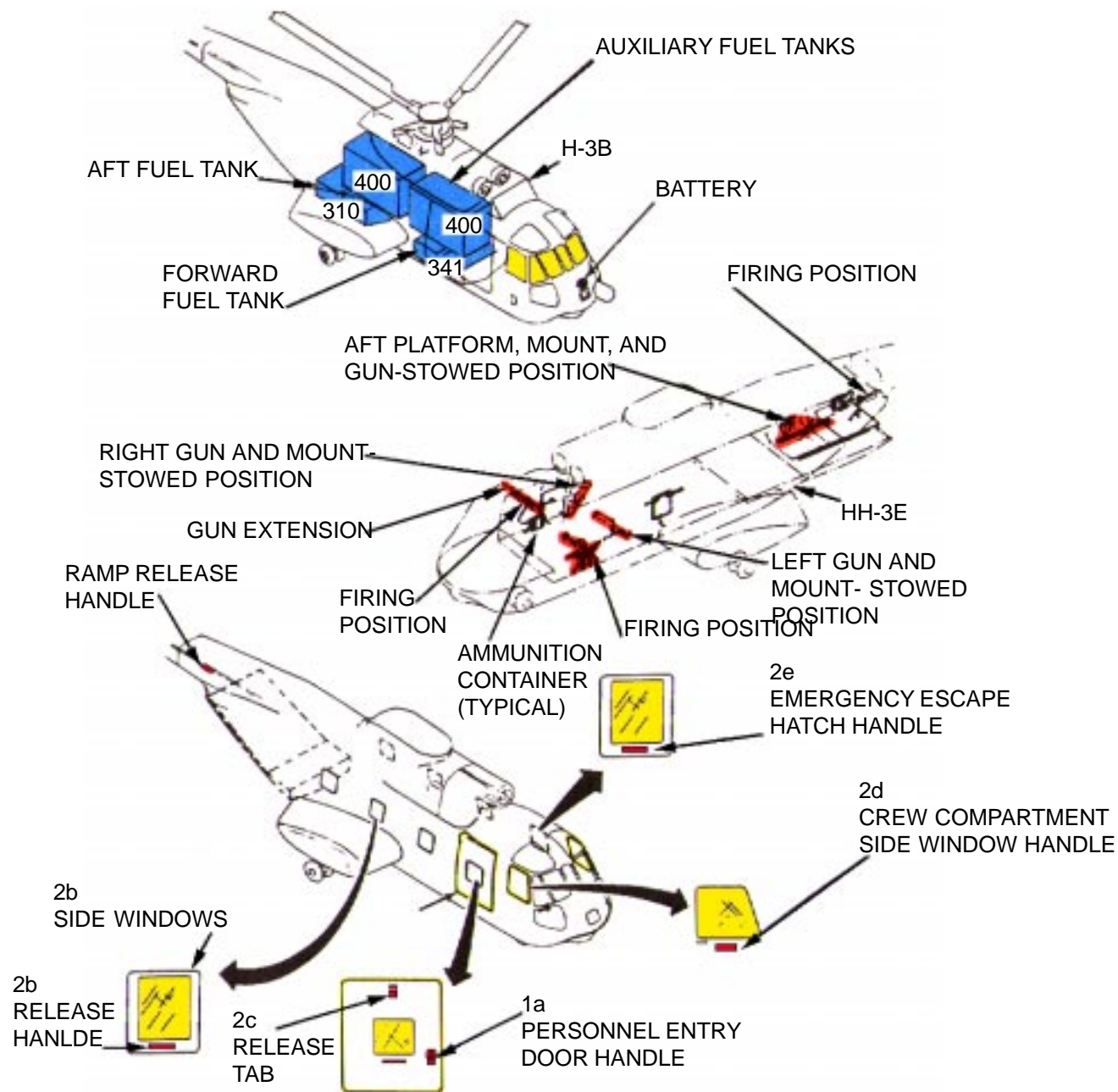
- a. Rotate handle, located on personnel entry door right forward fuselage, down and slide door aft.

#### 2. EMERGENCY ENTRY

- a. Pull ramp release handle, located on tail pylon under cover, down. Ramp will open by its own weight.
- b. Pull release handle, on sponson jettisonable windows located left and right fuselage, down and remove windows.
- c. Pull release tab, located on personnel entry door, down and pull door aft.
- d. Press button to release handle, on crew compartment side windows, located on right and left fuselage, rotate down and forward. Pull window out and up.
- e. Pull release handle on emergency escape hatch, located forward left fuselage, down and remove hatch.

#### 3. CUT-IN

- a. Cut forward fuselage windows, and crew compartment door.



# ENGINE SHUTDOWN AND AIRCREW EXTRACTION

## 1. ENGINE SHUTDOWN

- Place engine speed control levers, located on overhead panel to OFF position.
- Pull emergency T-handles, located on overhead panel down.
- Place battery switch, located on overhead panel, in OFF position.

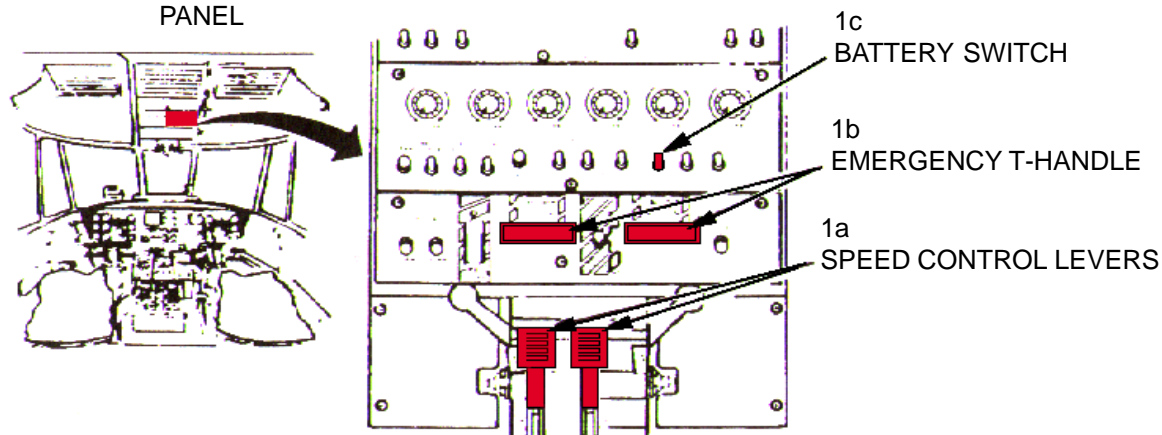
## 2. AIRCREW-LITTER-TROOP EXTRACTION

### NOTE:

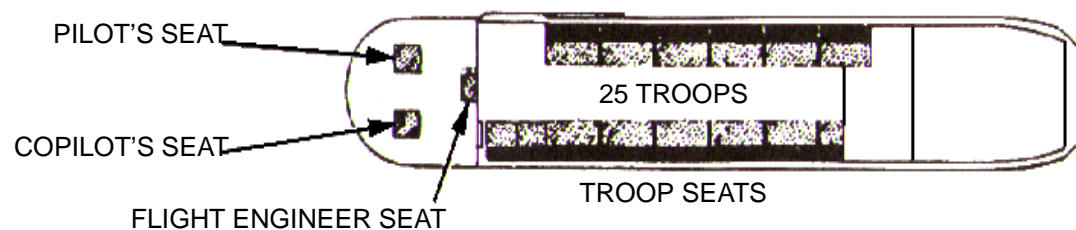
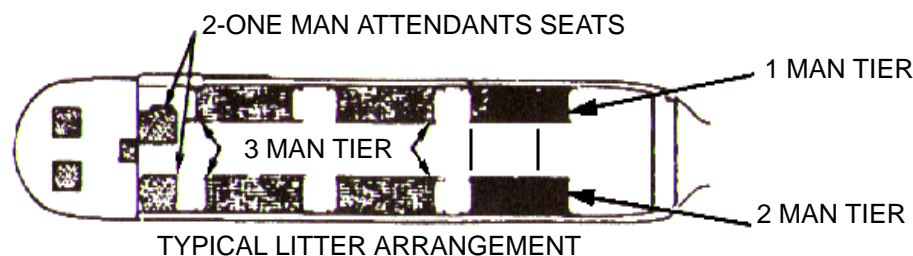
Aircrew seats are equipped with shoulder harness and lap belts. Troop seats are fitted with safety belts only.

- Unlatch lap belts and remove shoulder harness from crewmember(s).
- Unstrap occupants in the litters. Some patients may be connected to medical equipment.
- Unlatch safety belts in troop compartment.

OVERHEAD ENGINE CONTROL QUADRANT AND SWITCH PANEL



CABIN ARRANGEMENTS FOR AIRCREW, LITTER AND TROOP EXTRACTIONS





## SPECIAL TOOLS/EQUIPMENT

Power Rescue Saw  
Crash Ax

## AIRCRAFT ENTRY

## 1. NORMAL ENTRY

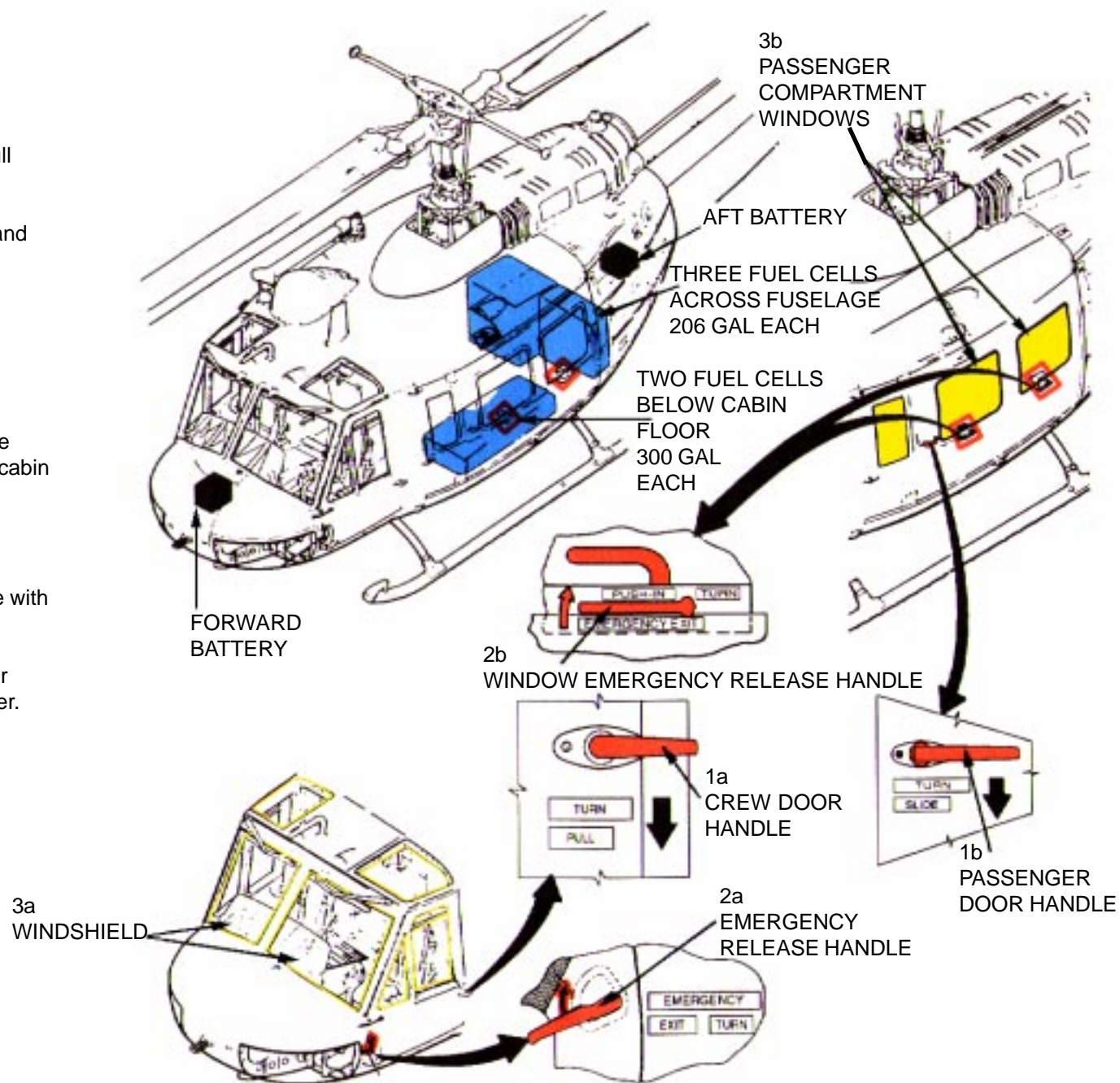
- a. Turn crew door handle clockwise and pull door open.
- b. Turn passenger door handle clockwise and slide door aft.

## 2. EMERGENCY ENTRY

- a. Turn external crew door jettison handle clockwise and remove door completely.
- b. Turn window external emergency release handle clockwise and push window into cabin area.

## 3. CUT-IN

- a. Shatter windshield around edge of frame with ax or hammer.
- b. Shatter glass around frame of passenger compartment windows with ax or hammer.



# ENGINE SHUTDOWN AND AIRCREW EXTRACTION

## 1. ENGINE SHUTDOWN

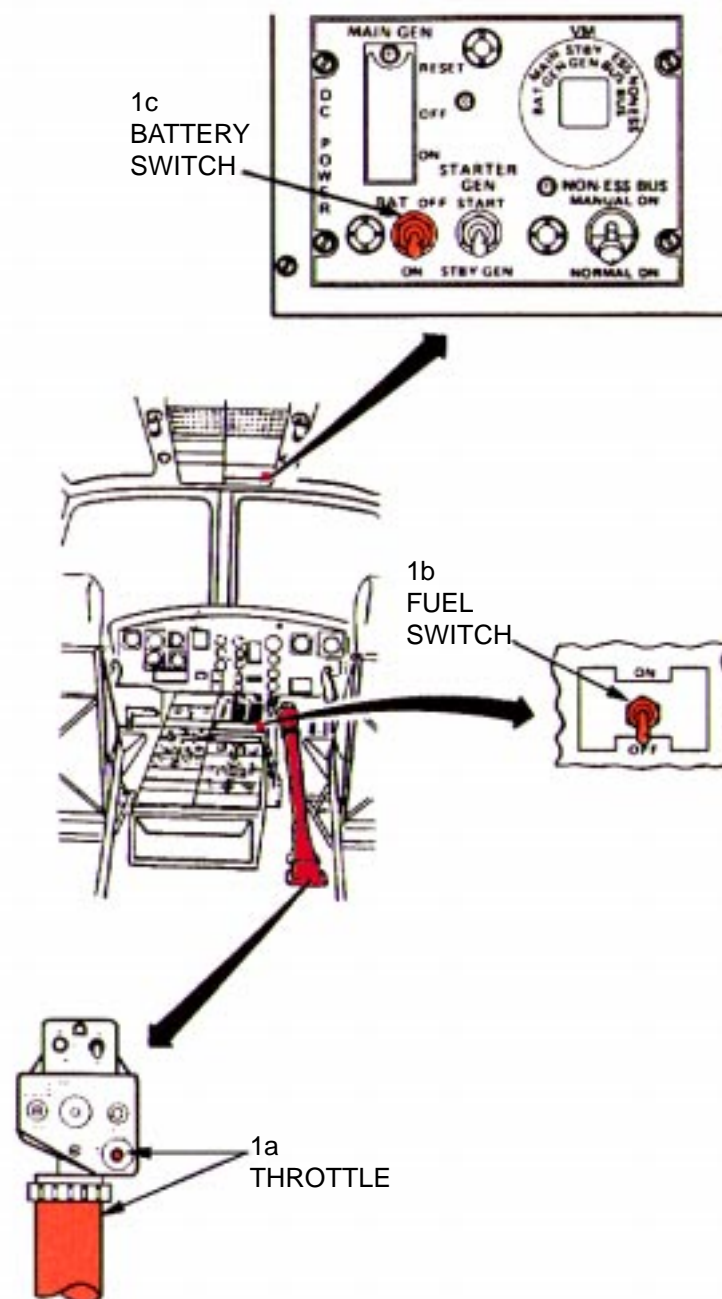
- Rotate throttle located on collective stick clockwise to idle position, press and hold detent button located on collective head, rotate throttle again to CUT-OFF position.
- Place fuel switch, located on pedestal console, to OFF position.
- Place battery switch, located on overhead console, to OFF position.

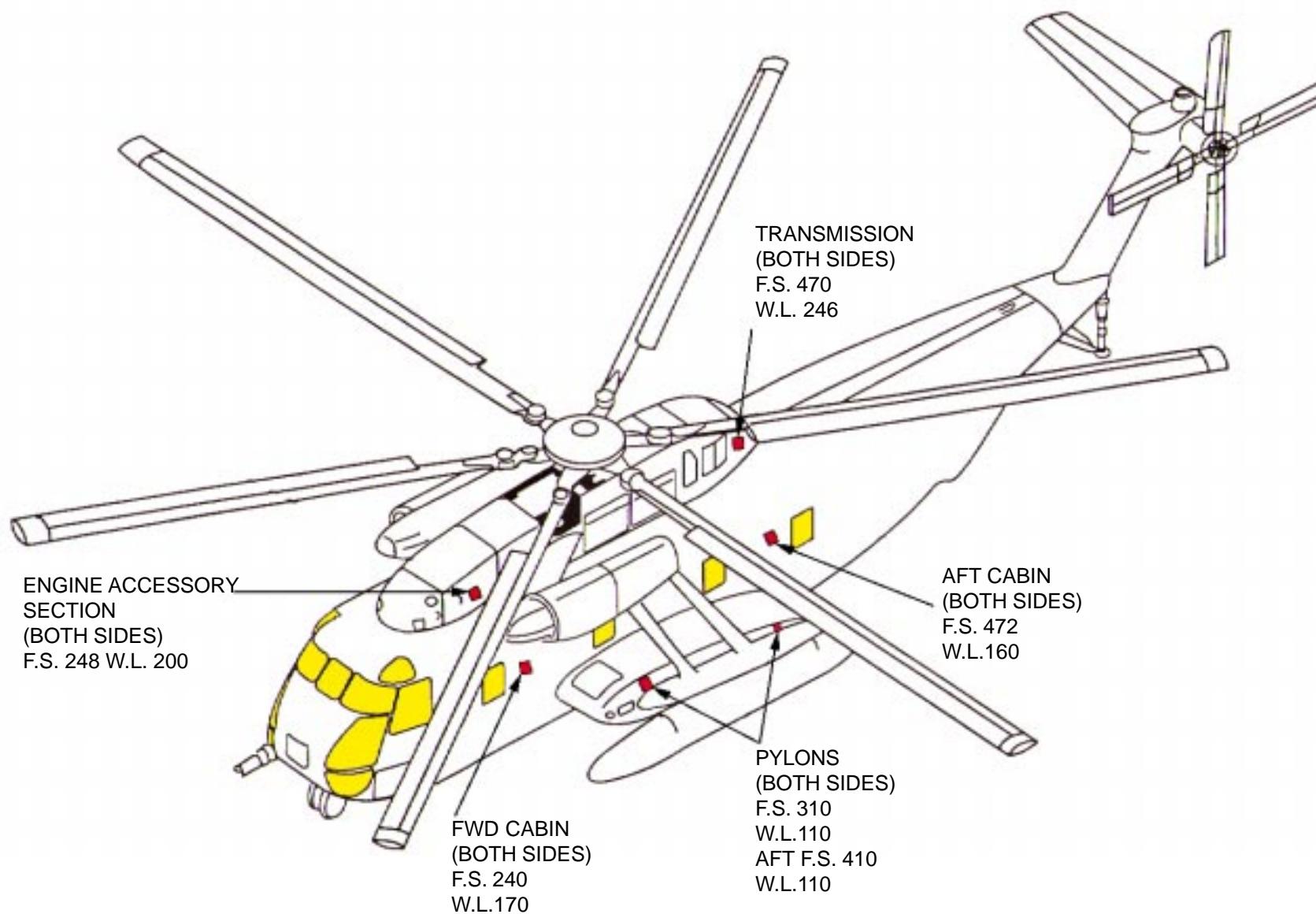
## 2. AIRCREW - TROOP EXTRACTION

### NOTE:

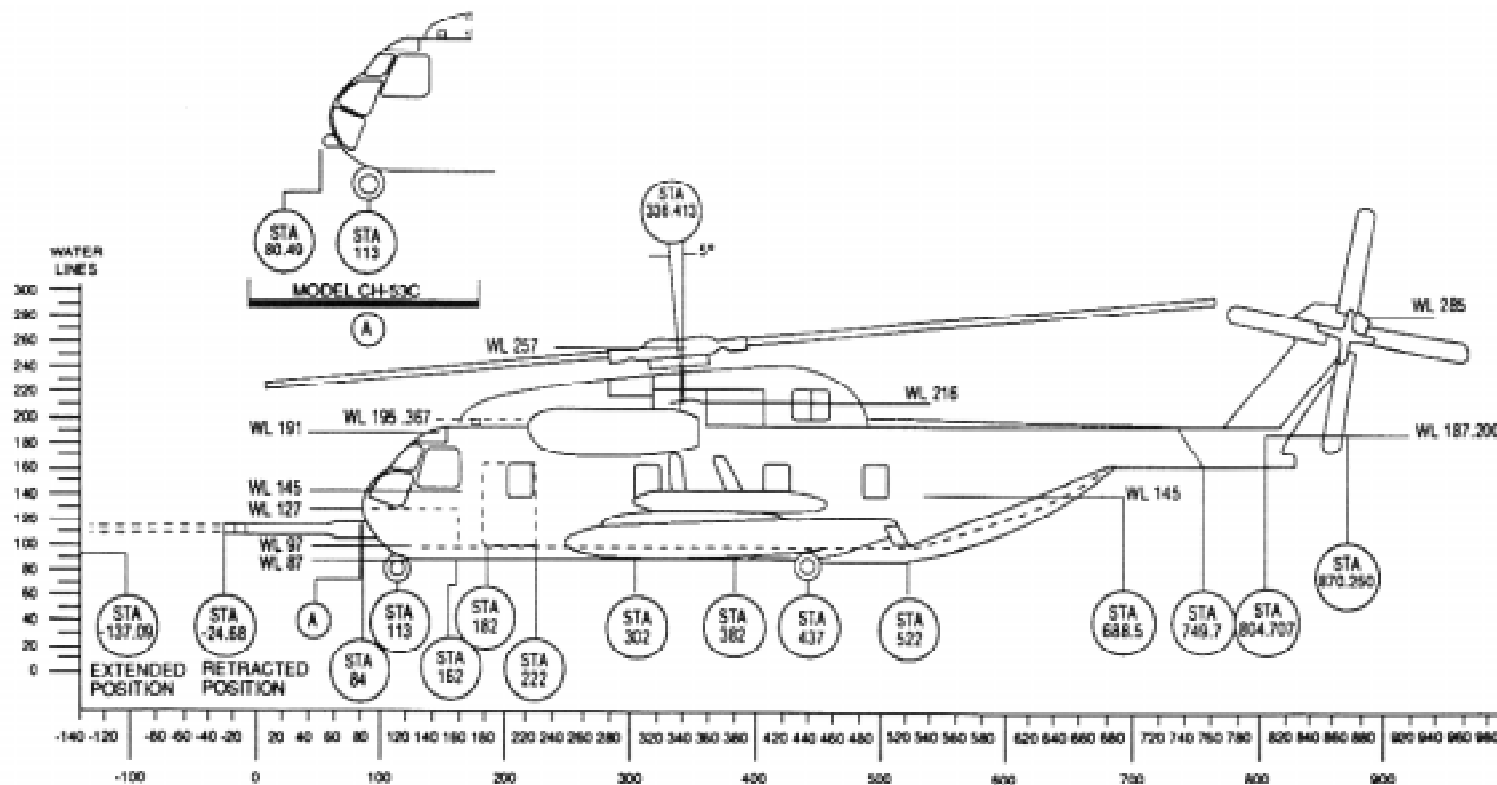
Aircrew seats are equipped with shoulder harness and lap belts. Troop seats fitted with safety belts only.

- Unlatch lap belt and remove shoulder harness from crewmembers.
- Unlatch safety belts in troop compartment.





# AIRCRAFT STATION LOCATIONS





# SPECIAL TOOLS/EQUIPMENT

## Power Rescue Saw

MH-53J

### AIRCRAFT ENTRY

#### 1. NORMAL ENTRY

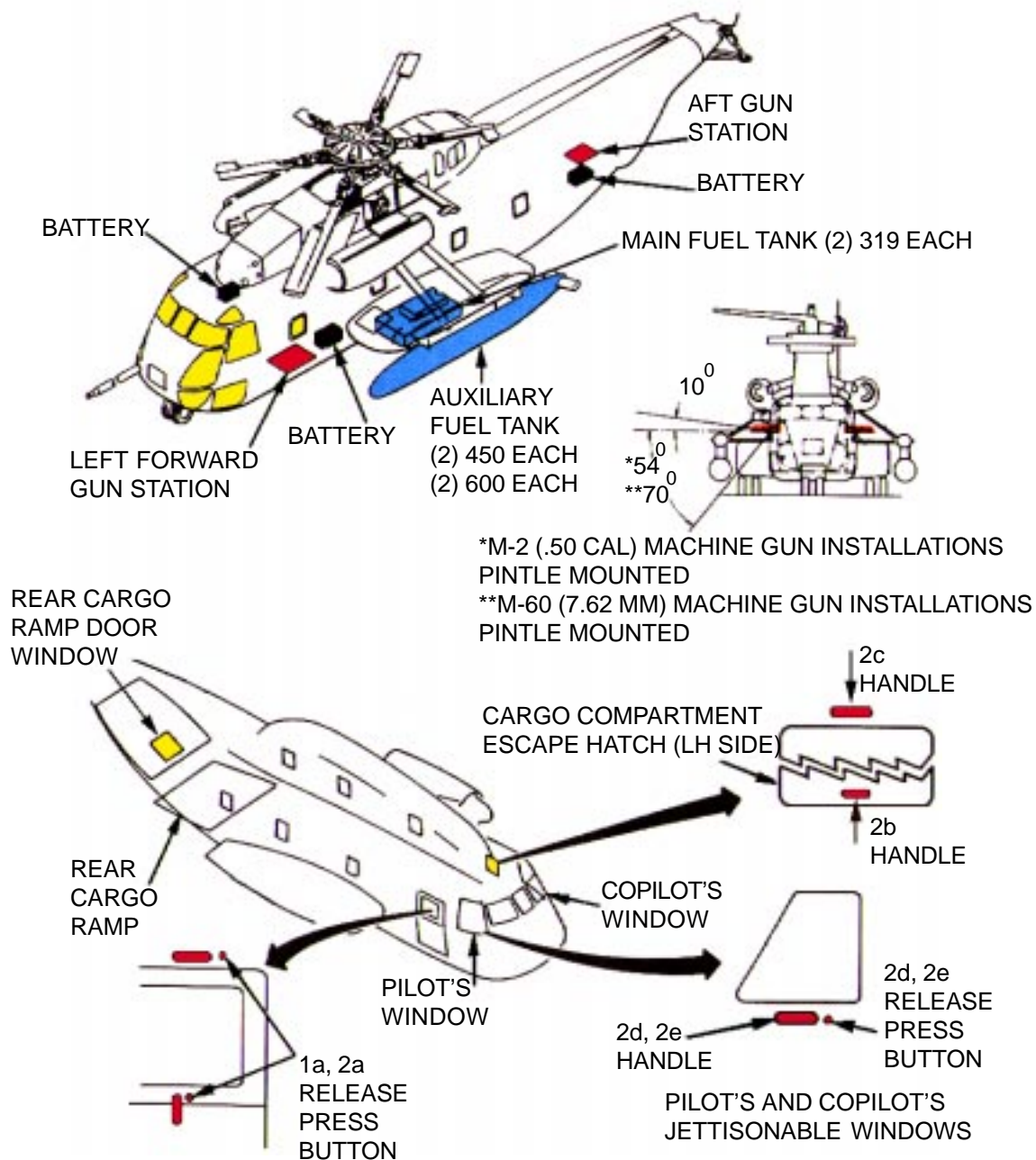
- a. Press button, located on crew compartment personnel door right forward fuselage, to release handle, rotate forward to unlatch. Push door inward.

#### 2. EMERGENCY ENTRY

- a. Press button, located on top of personnel door, to release handle, rotate handle forward to release door from hinges. Pull door out.
- b. Press release on handle, located on cargo compartment escape hatch left side of fuselage, rotate handle clockwise. Pull window out and up.
- c. Press release on handle, located above escape hatch on left side of fuselage, rotate handle counterclockwise and press hatch inboard.
- d. Press button, located on pilot's side window left forward fuselage, to release handle, rotate handle down and forward. Pull window out.
- e. Press button, located on copilot's side window right forward fuselage, to release handle, rotate handle down and forward. Pull window out.

#### 3. CUT-IN

- a. Cut fuselage windows at cargo ramp door window and emergency escape hatch.



# ENGINE SHUTDOWN AND AIRCREW EXTRACTION

MH-53J

## 1. ENGINE SHUTDOWN

### WARNING

RPMs must be reduced to prevent blade dipping, aircraft rotation, and boom contact.

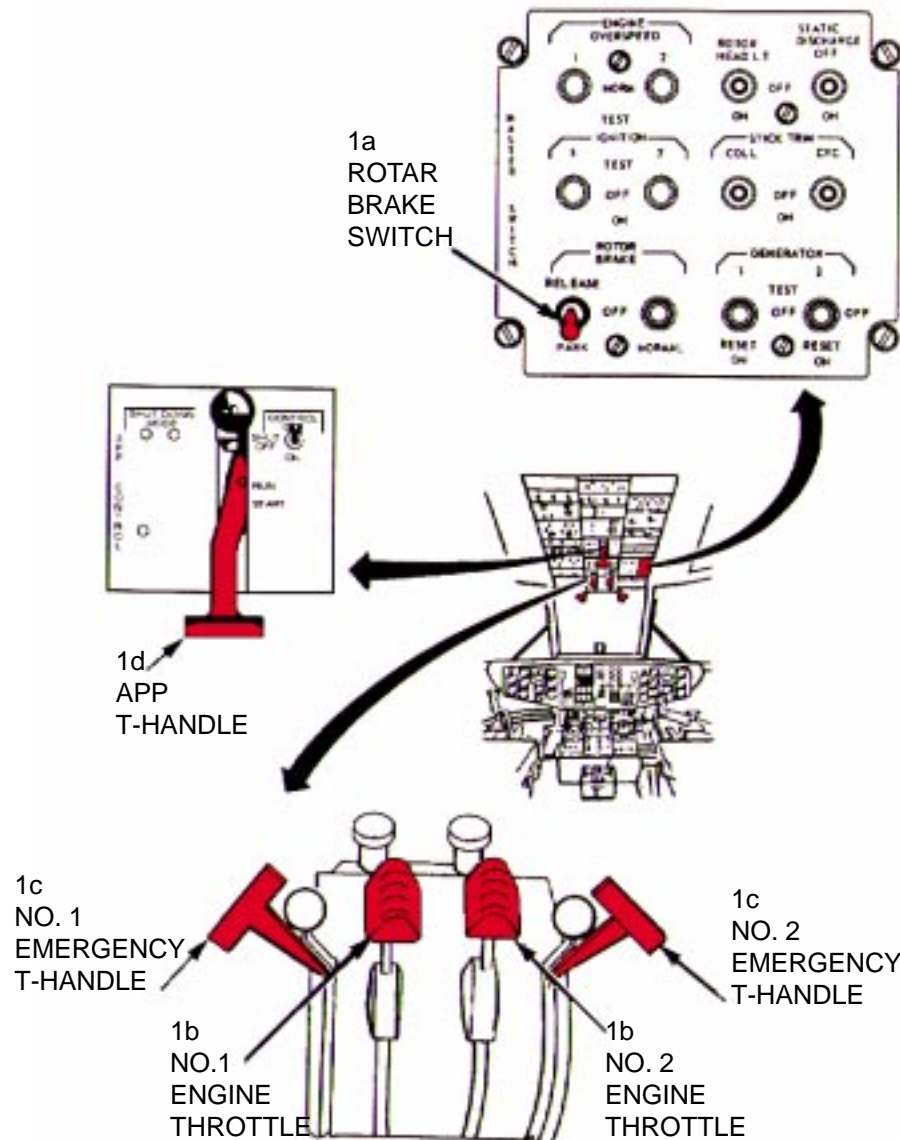
- Place Rotor Brake switch to PARK position.
- Retard Throttles to SHUT-OFF position.
- Place T-handles on engine control quadrant to FULL AFT position.
- Place APP T-handle to FULL AFT position.

## 2. AIRCREW EXTRACTION

### NOTE:

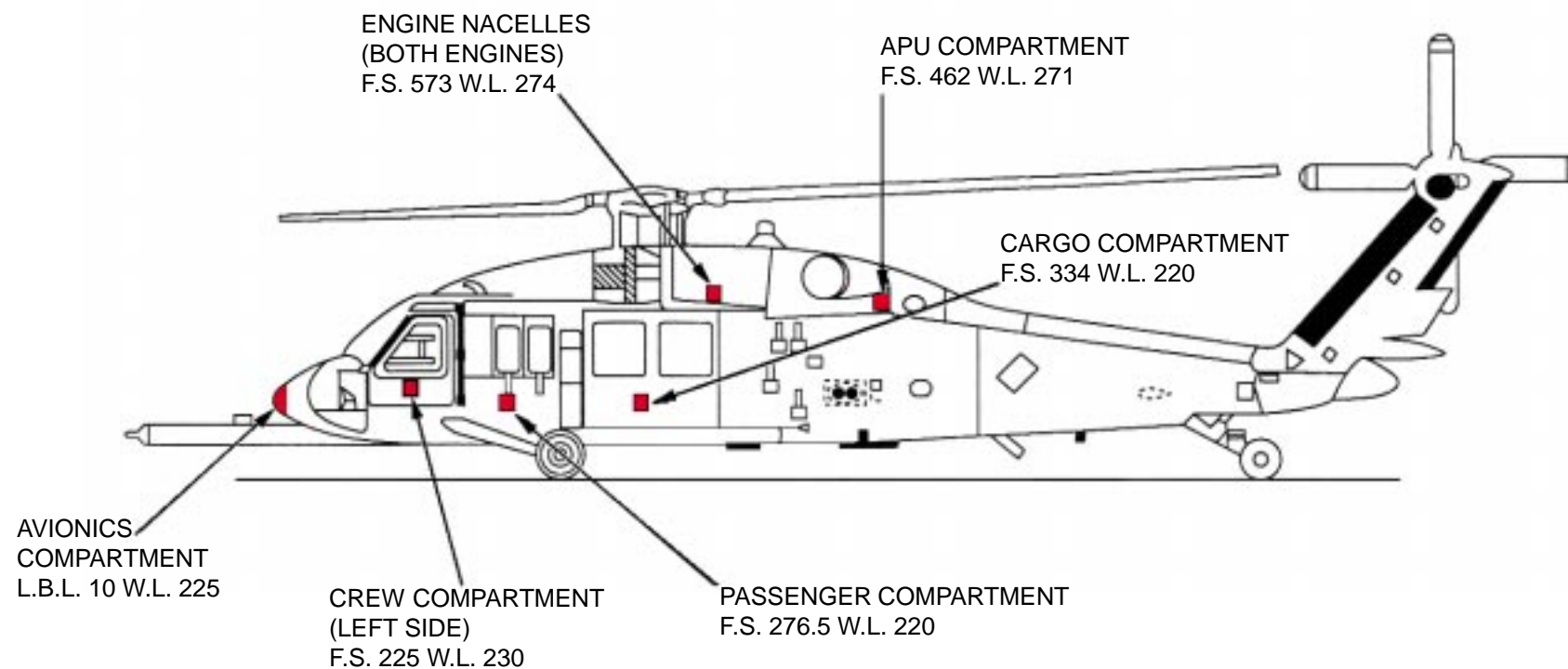
Aircrew seats are equipped with shoulder harness and lap belts only.

- Unlatch lap belt and remove shoulder harness from crewmember(s).
- Unlatch and remove safety belts in troop compartments.



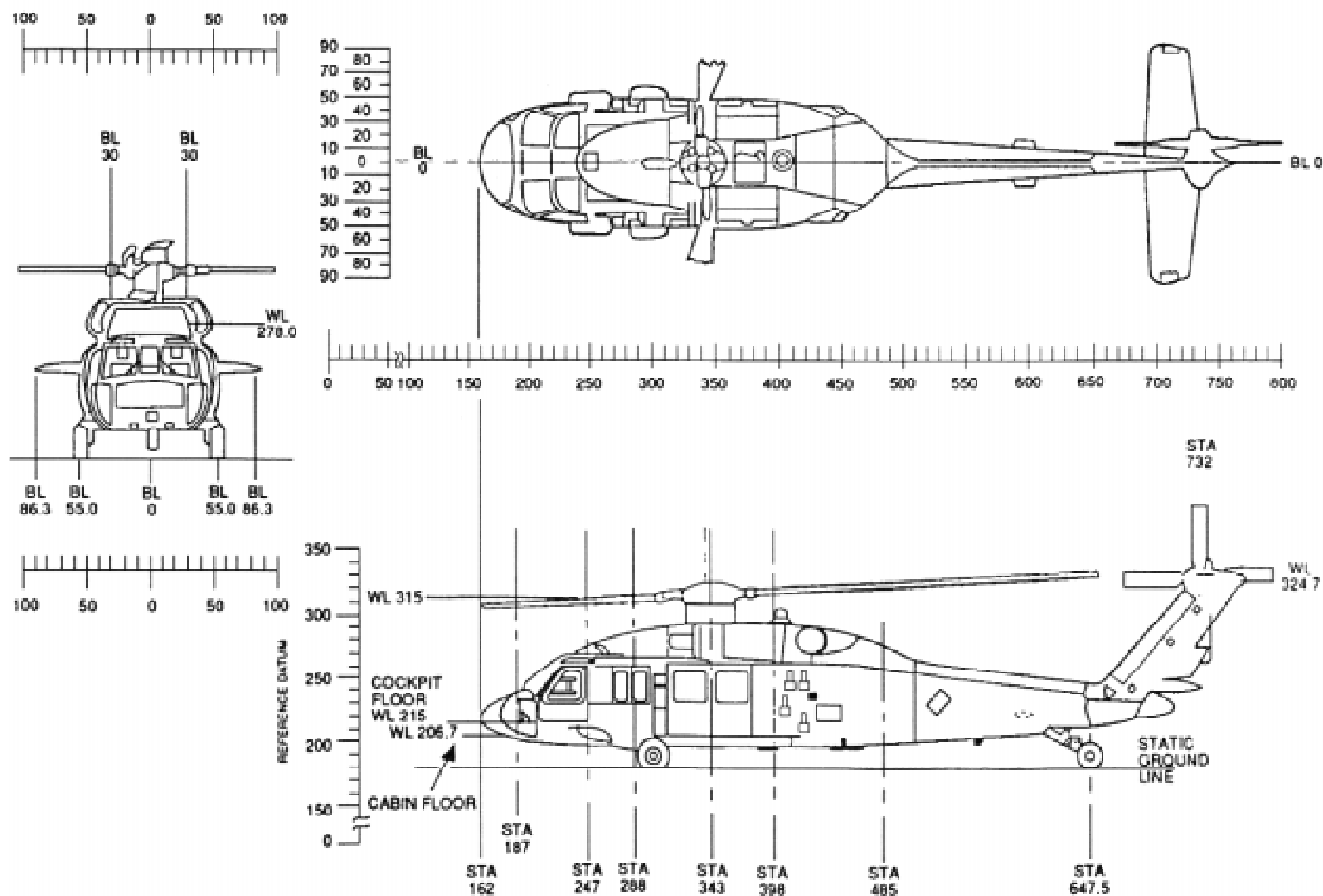
## AIRCRAFT SKIN PENETRATION POINTS

MH-60G



# AIRCRAFT STATION LOCATIONS

MH-60G





## SPECIAL TOOLS/EQUIPMENT

Power Rescue Saw  
Crash Ax

MH-60G

## AIRCRAFT ENTRY

## 1. NORMAL ENTRY

- a. Turn cockpit door handle counterclockwise to the open position to open door.
- b. Turn cabin door handle counterclockwise to the open position and slide door aft.

## 2. EMERGENCY ENTRY

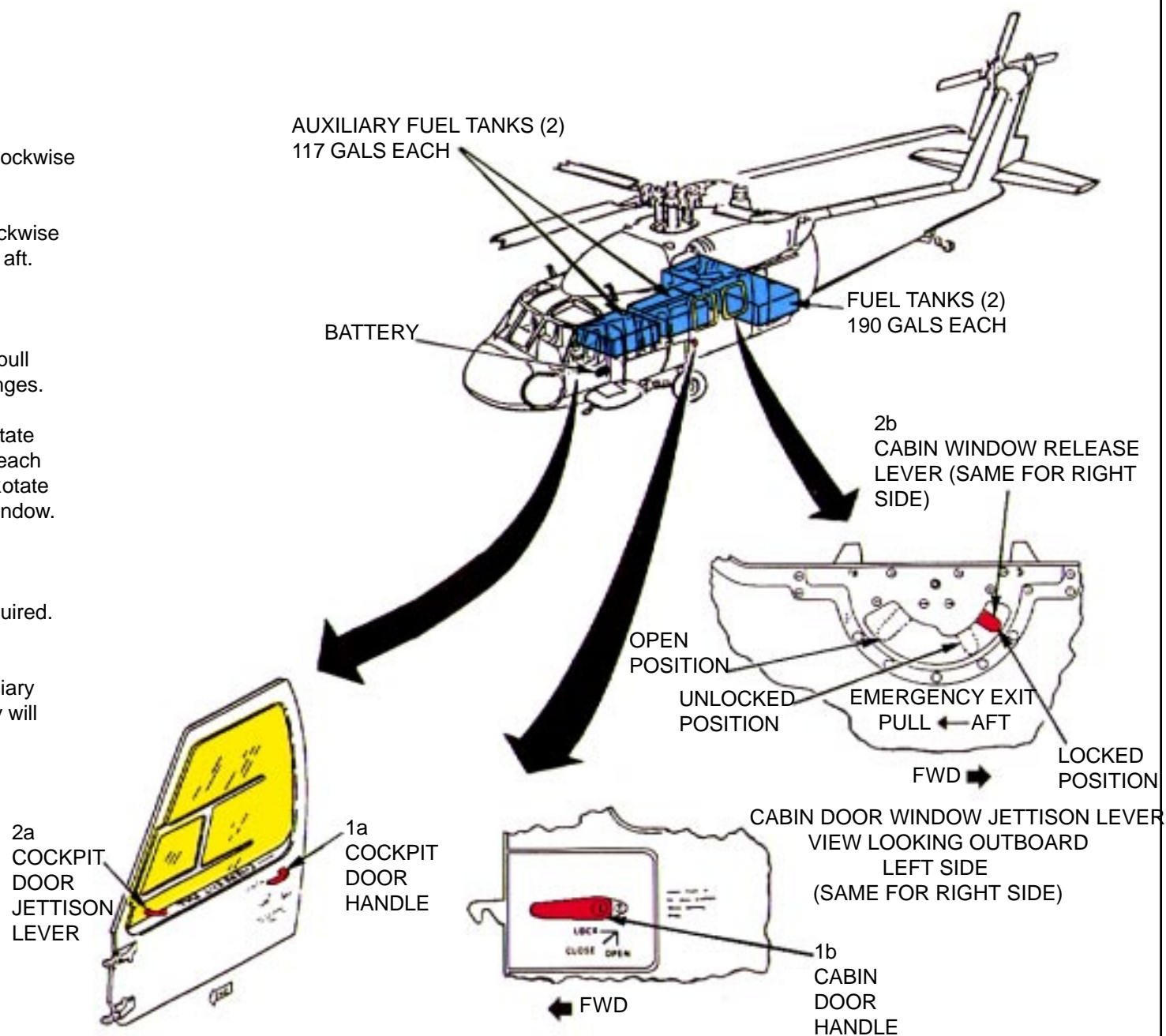
- a. Break window in cockpit door and pull jettison lever aft to release door hinges.
- b. Break window in cabin door and rotate emergency handle, located below each window, to the aft open position. Rotate bottom of window out to remove window.

## 3. CUT-IN

- a. Break window or windshield as required.

## NOTE:

Future replacement of internal auxiliary fuel tanks will be 185 gallons. They will be crash-worthy and self-sealing.



# ENGINE SHUTDOWN AND AIRCREW EXTRACTION

## 1. ENGINE SHUTDOWN

### NOTE:

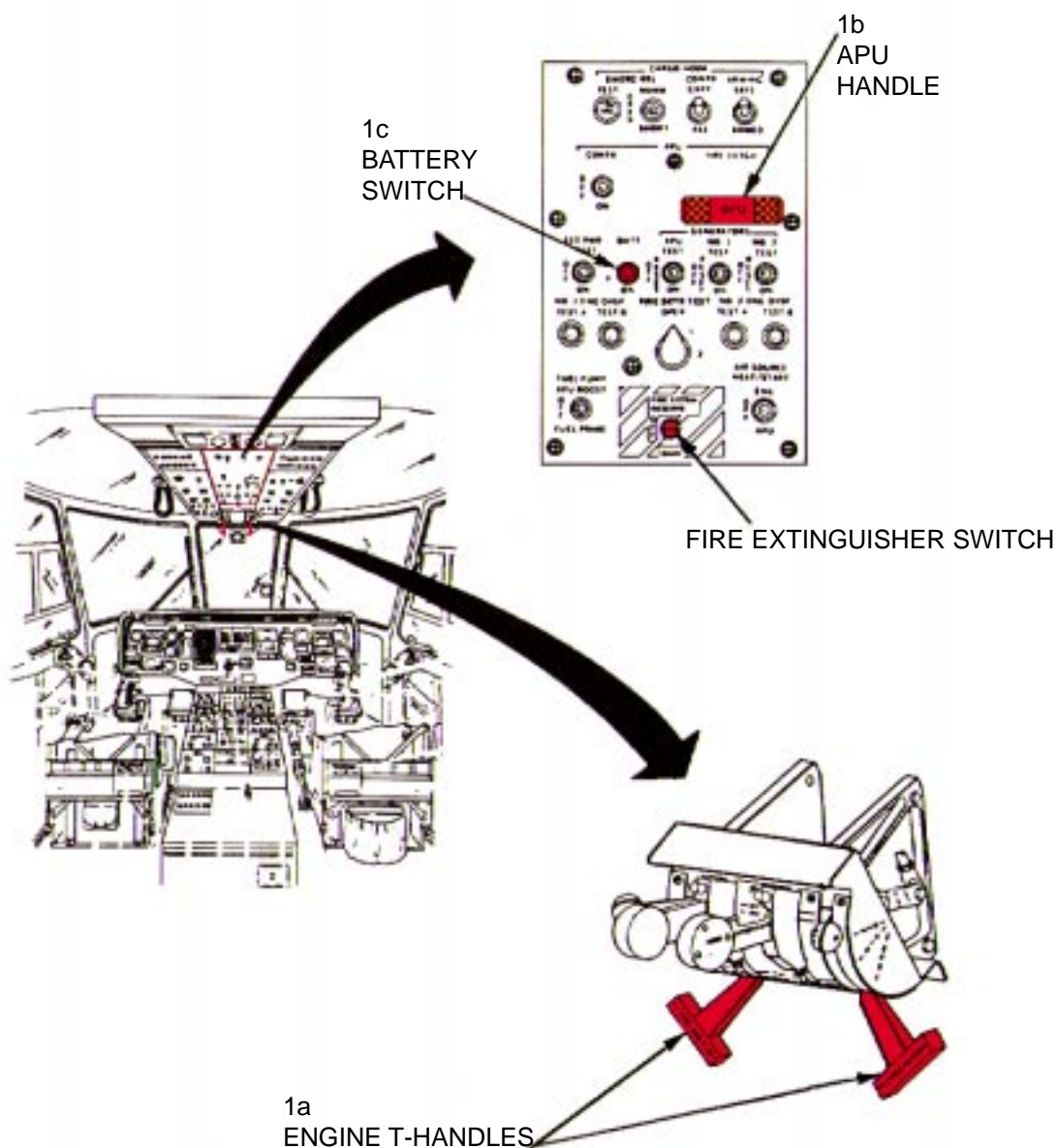
To activate the installed fire extinguishing system, on T-handle must be pulled (agent is discharged to last T-handle pulled). Then reposition the fire extinguisher switch from OFF to MAIN or RESERVE. Battery switch must be in the ON position.

- Pull engine emergency T-handles, located on control quadrant, FULL aft.
- Pull APU T-handle, located on upper console, DOWN.
- Place battery switch, located on upper console, to the OFF position.

## 2. AIRCREW - TROOP EXTRACTION

### NOTE:

- All aircrew seats have a complete lap belt and dual torso restraint shoulder harness attached to a rotary release buckle.
  - All troop seats have a lap belt and shoulder harness attached to a rotary release buckle.
- Release aircrew from seats by rotating rotary release buckle. Move restraints away before extraction to prevent entanglement.
  - Release troops from seats by rotating rotary release buckle. Move restraints away before extraction to prevent entanglement.



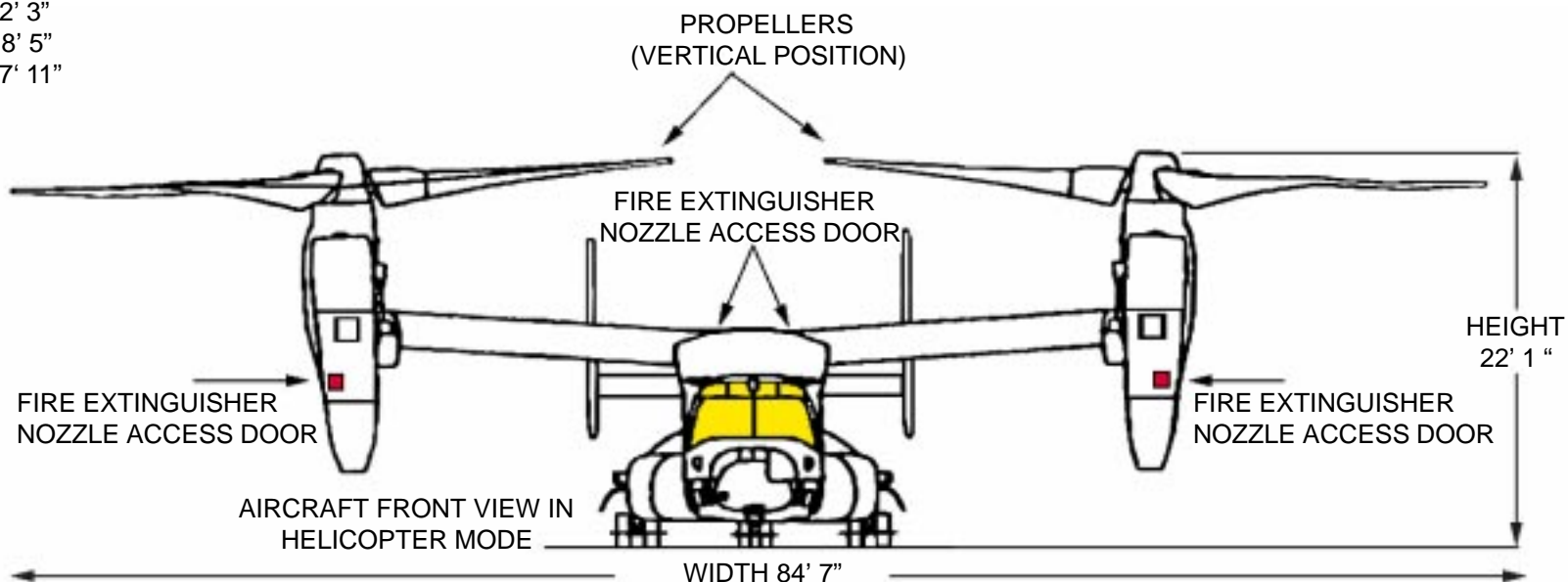
# V-22.1 AIRCRAFT HAZARDS AND DIMENSIONS

V-22

T.O. 00-105E-9

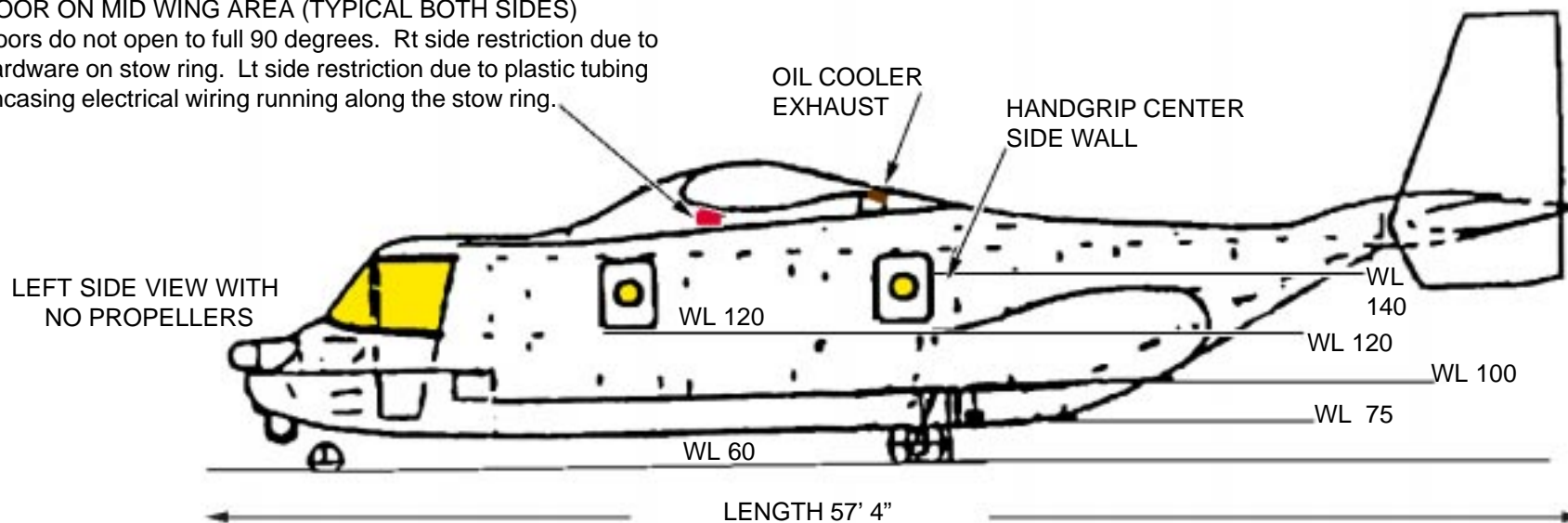
DIMENSIONS WHEN WINGS ARE STOWED

LENGTH 62' 3"  
WIDTH 18' 5"  
HEIGHT 17' 11"



SPRING LOADED FIRE EXTINGUISHER NOZZLE ACCESS DOOR ON MID WING AREA (TYPICAL BOTH SIDES)

Doors do not open to full 90 degrees. Rt side restriction due to hardware on stow ring. Lt side restriction due to plastic tubing encasing electrical wiring running along the stow ring.



# AIRCRAFT HAZARDS-Continued

V-22

T.O. 00-105E-9

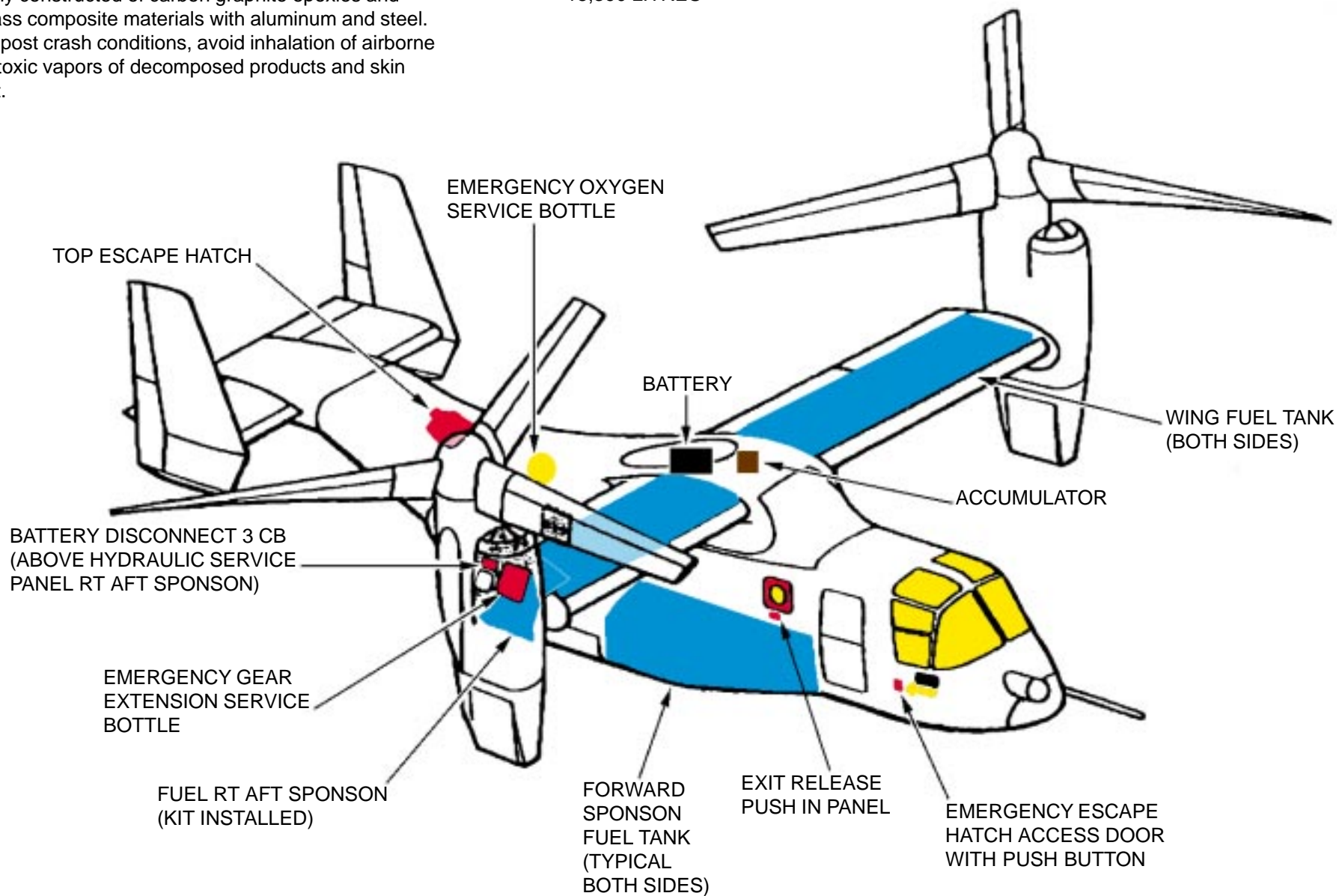
## WARNING

### AIRFRAME MATERIALS

Primarily constructed of carbon graphite epoxies and fiberglass composite materials with aluminum and steel. During post crash conditions, avoid inhalation of airborne fibers, toxic vapors of decomposed products and skin contact.

PNEUMATIC SYSTEM: 5,000 PSI  
ENGINE OIL RESERVOIR: 3 GALS

TOTAL FUEL:  
3,640 GALS  
15,390 LITRES





# AIRCRAFT HAZARDS-Continued

WING FIRE PROTECTION SYSTEM (WFPS)  
SOF CONFIGURATION

## NOTE:

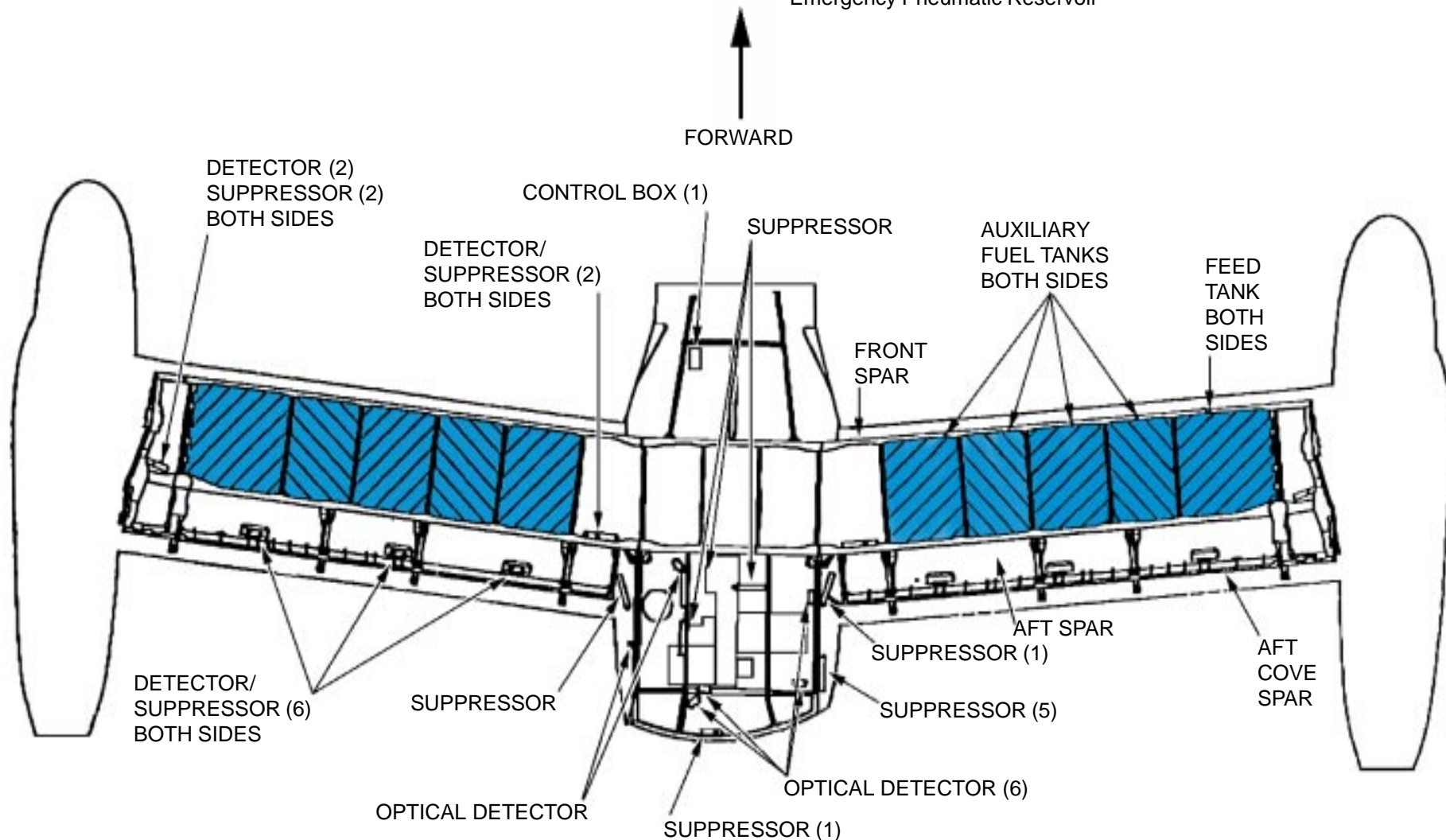
Numbers in parentheses are totals.

## FLAMMABLE FLUIDS AND HAZARDOUS MATERIALS

Fuel Tanks	Variable Frequency Generator No. 3
Mid Wing Gearbox Oil	Variable Frequency Generator No. 4
Propropor Gearbox Oil	Shaft Driven Compressor
Engine Oil	Auxiliary Power Unit
Tilt-Axis Gearbox Oil	No.3/Utility Hydraulic Sys. Accumulator
Emergency Oxygen	Windshield Washer
Main Landing Gear	Forward Landing Gear
Emergency Pneumatic Reservoir	

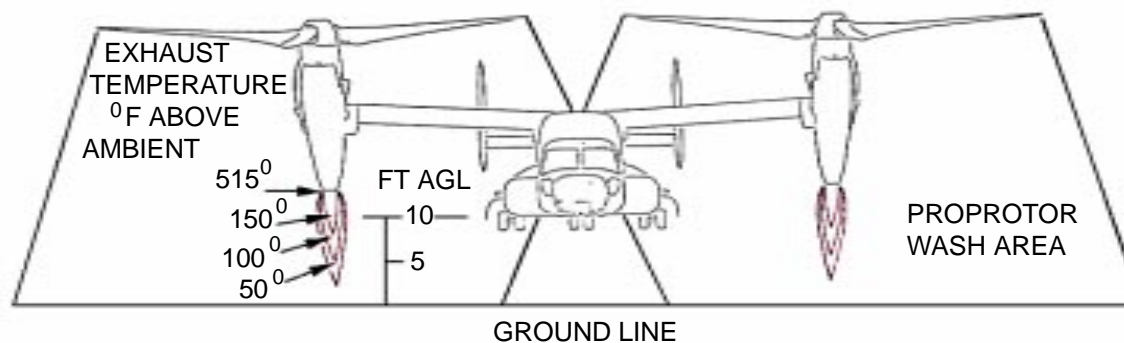
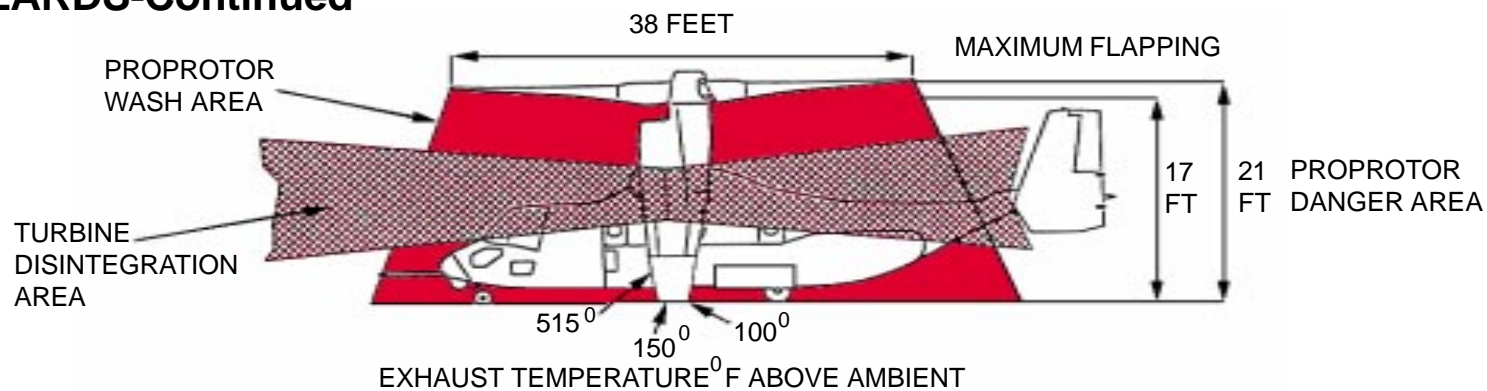
V-22

T.O. 00-105E-9

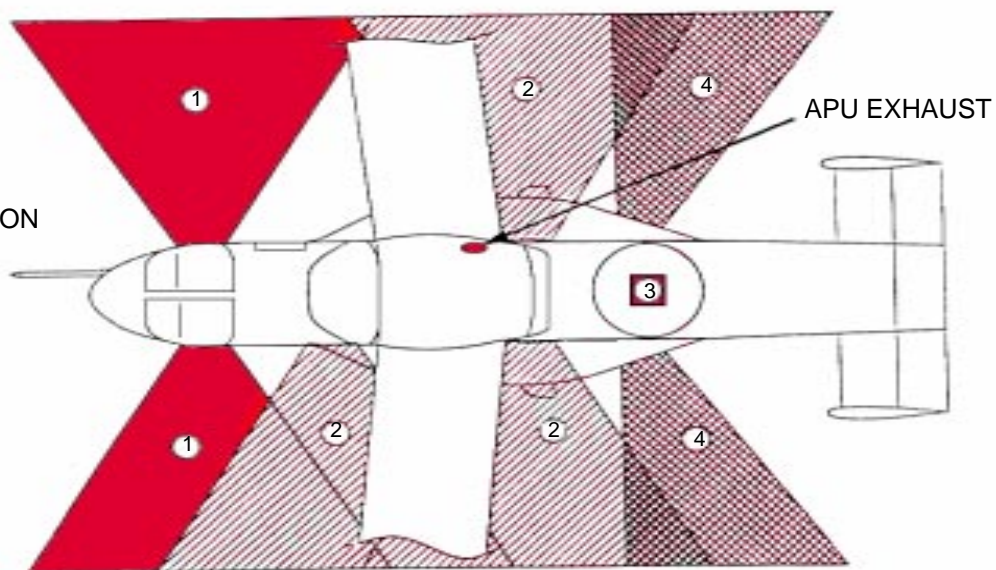


# AIRCRAFT HAZARDS-Continued

V-22



- 1 COCKPIT SIDE WINDOW JETTISON
- 2 CABIN ESCAPE HATCH JETTISON
- 3 CABIN UPPER ESCAPE HATCH JETTISON
- 4 CHAFF/FLARE

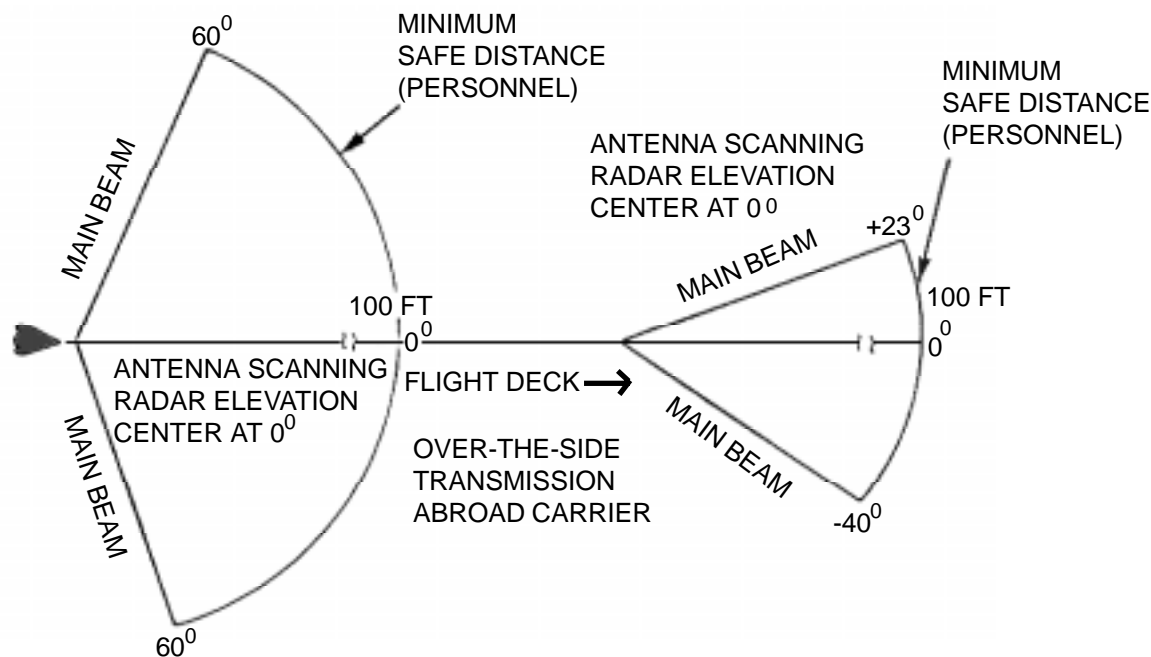


# AIRCRAFT HAZARDS-Continued

## MULTIFUNCTION RADAR HAZARD AREA

### NOTES:

1. Minimum safe distance for personnel in multifunction radar ground or flight deck operations are shown by the arc. Do not enter the radiation hazard area inside the arc.
2. Do not conduct fueling operations within a radius of 140 feet of any operating radar antenna.
3. Ground operations for doppler radar require that antenna transmits into horn. Do not operate unit without horn.
4. When multifunction radar antenna is not radiating, minimum safe distance from other radiating antennas is 10 feet.



# AIRCRAFT HAZARDS-Continued

OBOGS, OBIGGS, FLARE/CHAFF, BATTERY DISCONNECT  
AND LANDING GEAR PIN LOCATIONS

V-22

## 1. OBOGS/OBIGGS

- a. An onboard oxygen generating system (OBOGS) produced oxygen enriched air for the crew breathing and an onboard inert gas generating system (OBIGGS) produced nitrogen for fuel tank inerting. Both systems are located in the cabin floor panel.

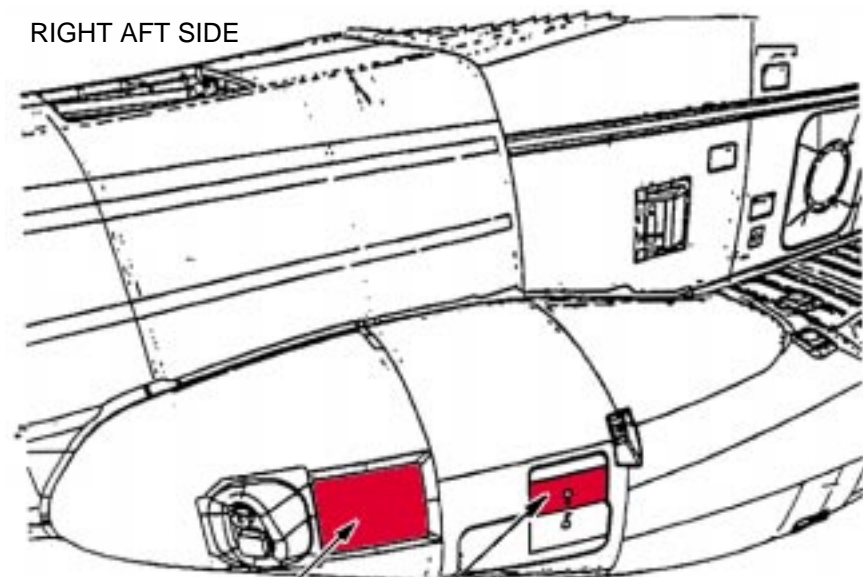
## 2. FLARE AND CHAFF (Pyrotechnics)

- a. Dispensers are located on the aft right and left sponsons.

## 3. BATTERY DISCONNECT

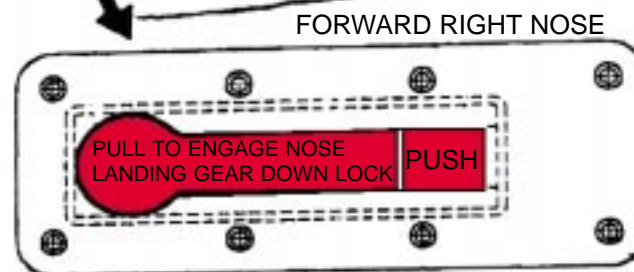
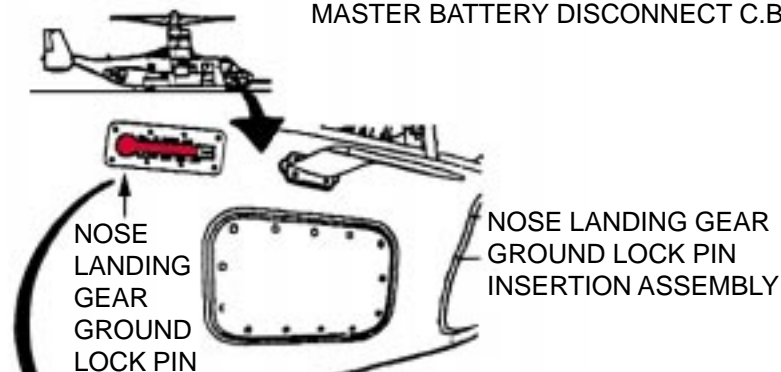
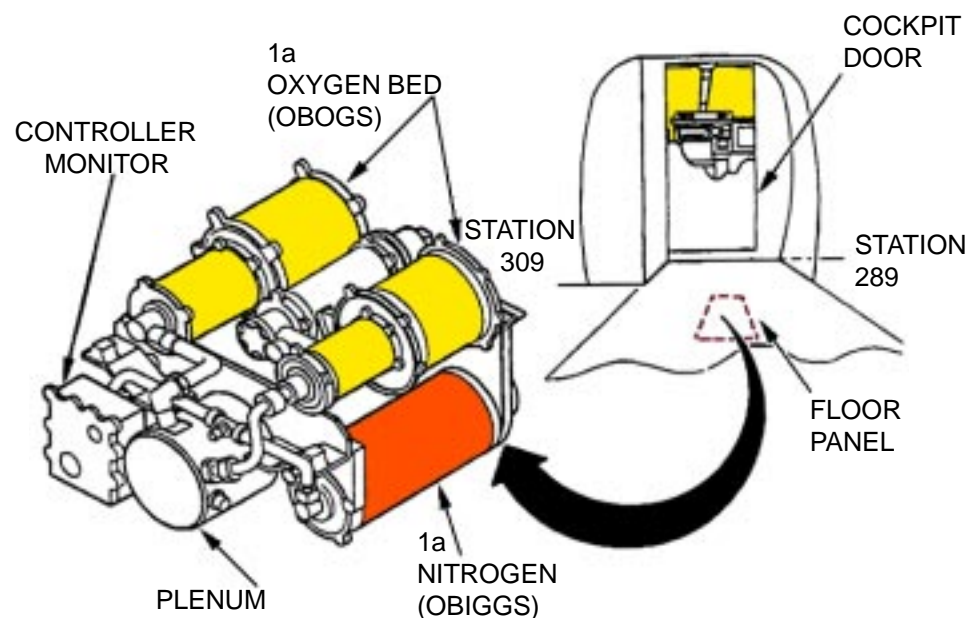
- a. The two external battery disconnect circuit breakers are located on the right aft sponson in the external ramp control panel. Pulling the two circuit breakers will remove all electrical loads with the exception of the ramp and ground refuel defuel panel.

RIGHT AFT SIDE



2a  
CHAFF/FLARE DISPENSER  
(SAME OPPOSITE SIDE)

3a  
EXTERNAL RAMP CONTROL PANEL  
MASTER BATTERY DISCONNECT C.B.2.





# AIRCRAFT HAZARDS-Continued

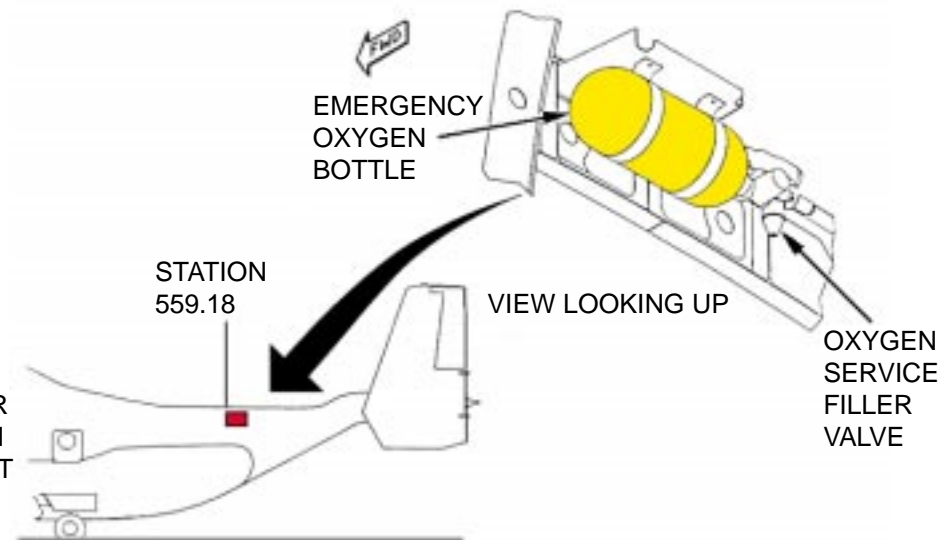
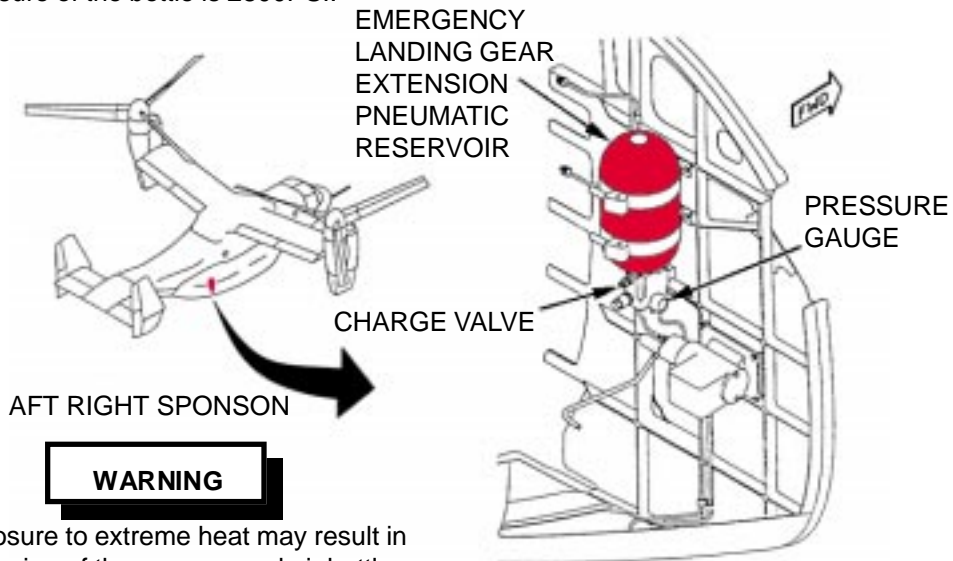
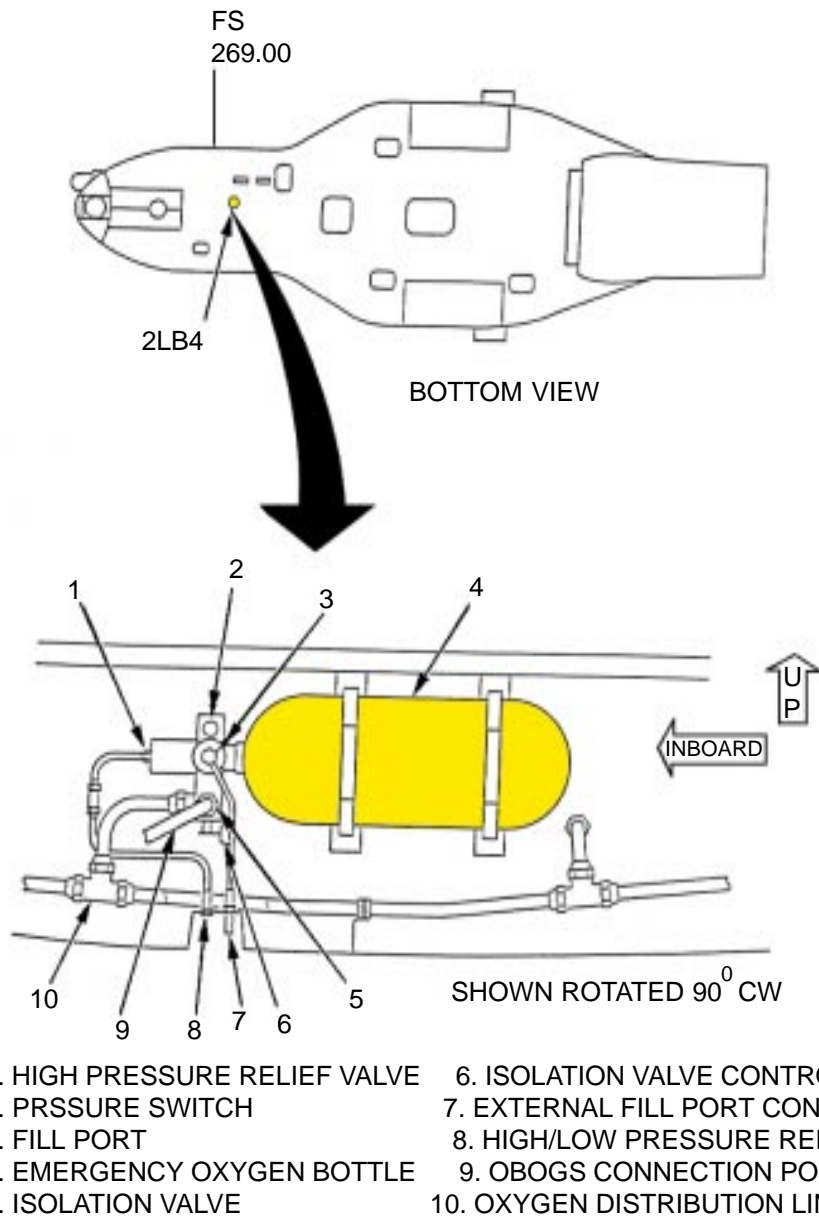
## EMERGENCY LANDING GEAR EXTENSION PNEUMATIC RESERVOIR AND EMERGENCY OXYGEN BOTTLE LOCATIONS

### NOTE:

The aircraft is equipped for pneumatic emergency gear extension system. The air reservoir bottle is located to the right aft sponson. The nominal pressure of the bottle is 2800PSI.

V-22

T.O. 00-105E-9



**SPECIAL TOOLS/EQUIPMENT**

Power Rescue Saw  
Crash Ax

**AIRCRAFT ENTRY****1. NORMAL ENTRY****NOTE:**

The ingress/egress systems consist of the jettisonable cockpit side windows, cabin door, internal cockpit door, four cabin escape hatches, and the cargo ramp.

**WARNING**

Do not approach aircraft until rotor blades have stopped.  
Approach aircraft on right side to normal entrance door.

- a. Turn door handle, lower bottom half of right cabin door, and raise top half of door until it locks in place.

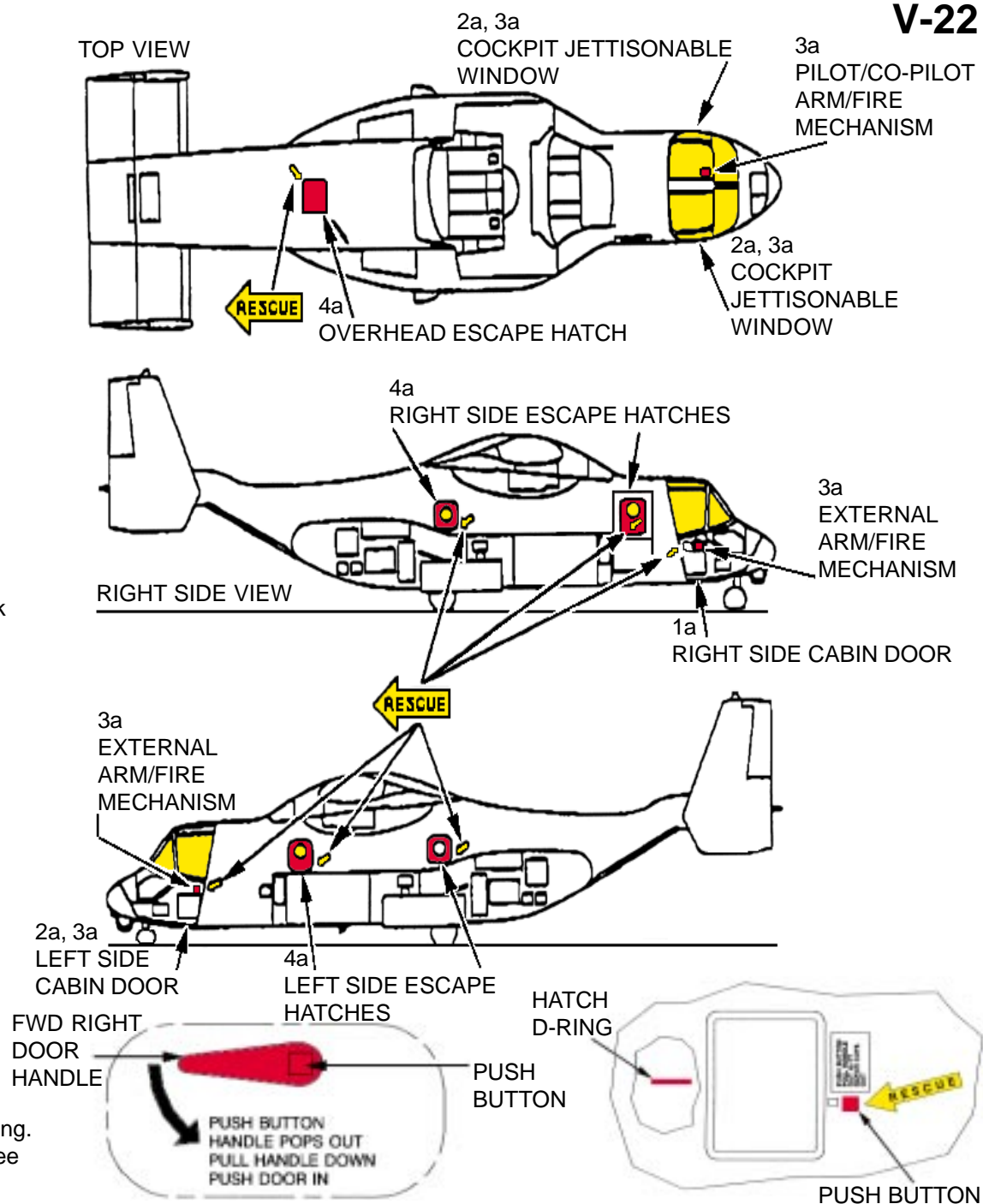
**2. EMERGENCY ENTRY (NON-EXPLOSIVE)**

- a. Internal and external emergency release levers are installed in the upper half of the cabin door. Push button, pull either lever to disengage door rollers from their tracks, the door lock pin (if engaged), and the door latch pins.  
b. Place door to the side away from the escape path.

**3. COCKPIT JETTISONABLE WINDOWS (EXPLOSIVE)****WARNING**

Personnel positioned within 50 feet of the window/hatch, (window equipped with linear explosive charge around periphery) during jettison could be injured by flying debris. Activation of the jettison system, when combustible fuel and /or vapors are present may result in a fire. Simultaneous window jettison can result unconsciousness or death to crewmembers.

- a. Approach aircraft from front. Right cabin window jettison D-ring is located beneath right cabin window. Left cabin window jettison D-ring is located beneath left cabin window.  
b. Push button and remove access panel to expose jettison D-ring.  
c. Step away from windows approximately 10 feet, at a 45 degree angle, face away from aircraft, and pull D-ring/lanyard firmly.

**V-22**

# AIRCRAFT ENTRY-Continued

## 5. CARGO RAMP

### NOTE:

The cargo ramp provides rapid loading and deployment of troops and cargo. It also affords emergency evacuation when on the ground.

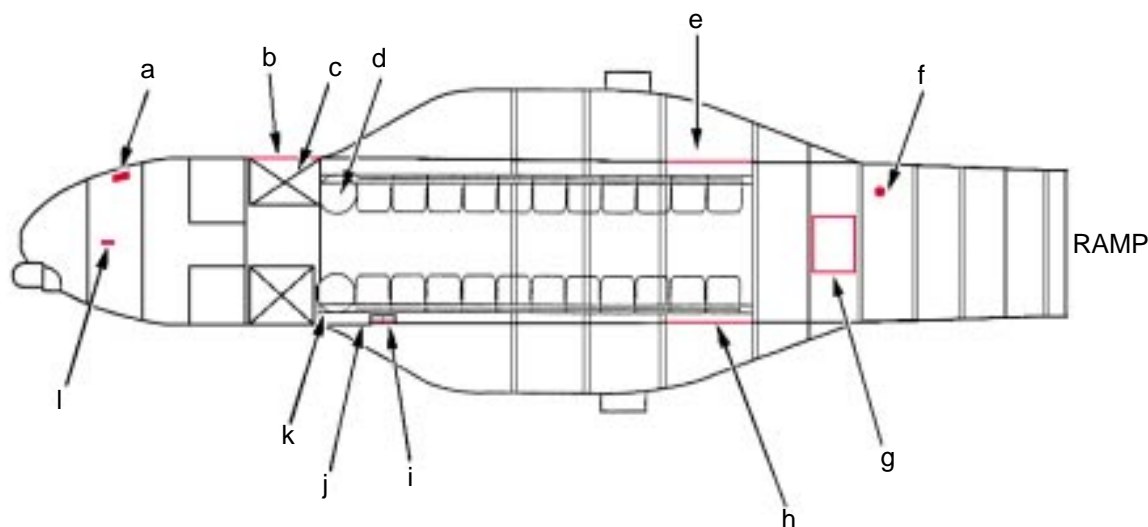
- a. The ramp may be lowered by opening the external ramp control access panel, located on the right aft sponson, and positioning the cargo ramp switch to OPEN. (Not installed on A/C #7.) The external battery disconnect circuit breakers are located inside this panel as well.

## 6. CUT-IN - WINDOW CUTTING ASSEMBLIES

- a. The side windows are removed by a window cutter assembly. Each assembly consists of a continuous length of explosive cord molded into a silicone rubber charge holder. A fiberglass retainer bolted to the window frame secures the charge holder against the side window. If pyrotechnics fail, cockpit windows are too thick for conventional ax and a power rescue saw OR extracation saw will have to be used.

## 7. PERSONNEL SURVIVAL EQUIPMENT LOCATIONS

- a. Forward Fire Extinguisher (mounted to bulkhead)
- b. Cabin Door and Escape Hatch
- c. Flotation Equipment (provisions)
- d. Alternate Seat Position or 20-Man Life Raft
- e. Aft Right Side Escape Hatch
- f. Aft Fire Extinguisher
- g. Escape/Maintenance Hatch (top of fuselage)
- h. Aft Left Side Escape Hatch
- i. First Aid Kit
- j. Forward Left Side Escape Hatch
- k. 12 - Man Life Raft
- l. Nuclear, Biological, Chemical (NBC), Ventilator



# AIRCRAFT ENTRY-Continued

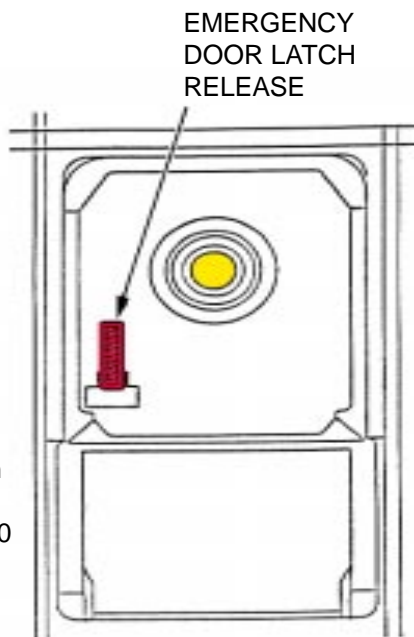
## COCKPIT AND CABIN ESCAPE HATCHES

### 8. CABIN ESCAPE HATCHES (EXPLOSIVE)

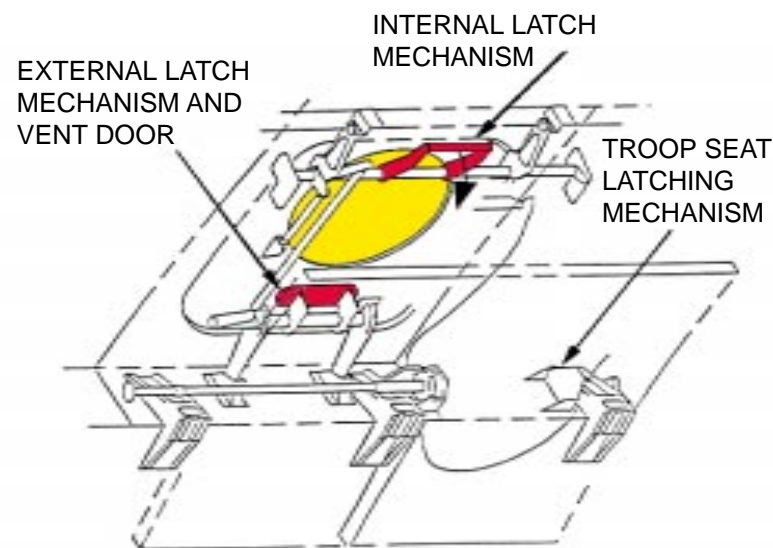
#### NOTE:

Four escape hatches are provided in addition to the cabin upper door. Two hatches are located on the left side of the cabin, one on the right side, and one in the aft cabin ceiling above the cargo ramp. Internal and external release mechanisms are provided for all escape hatches.

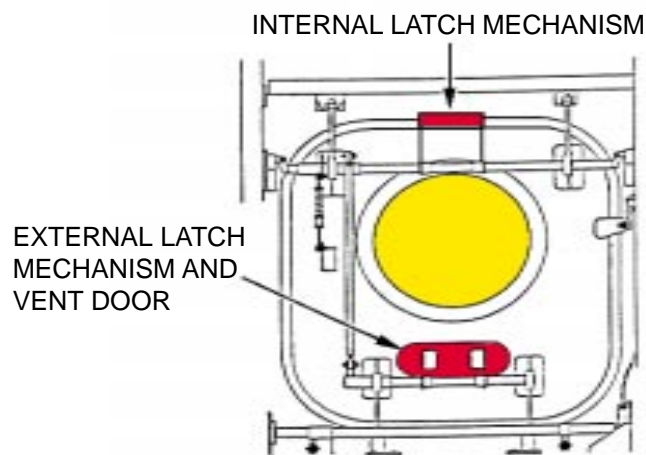
- An external release is located in a recessed compartment near the side of each escape hatch and is similar to the jettisoning window system. Open recessed compartment to expose clipped handle which is connected to the firing mechanism by a 10 foot lanyard.
- A pull force of 20 - 25 pounds is required to arm and fire each cabin escape hatch.



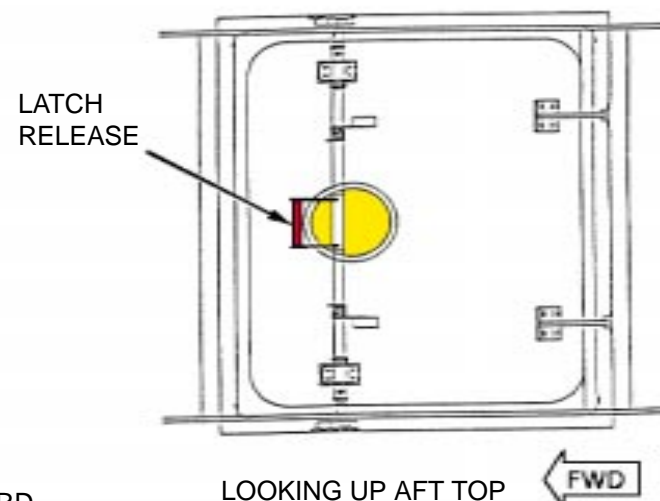
MAIN CABIN DOOR



RIGHT AND LEFT AFT EMERGENCY ESCAPE HATCH AND TROOP SEAT RELEASE



LOOKING OUTBOARD LEFT FORWARD  
EMERGENCY ESCAPE HATCH AND  
TROOP SEAT RELEASE HANDLES



LOOKING UP AFT TOP  
FUSELAGE ESCAPE HATCH



# ENGINE AND APU SHUTDOWN

## 1. ENGINE SHUTDOWN

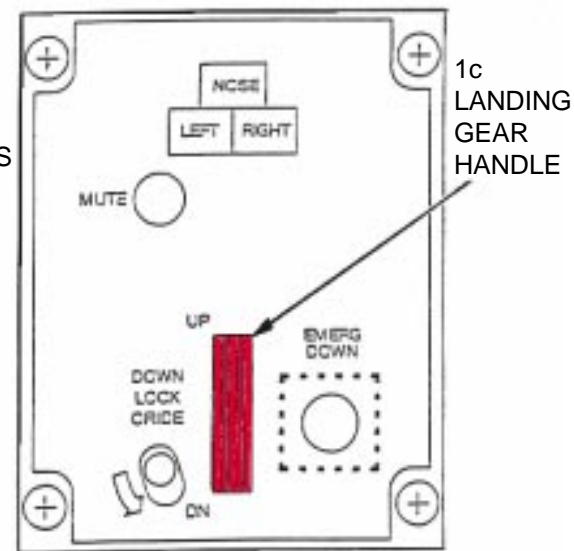
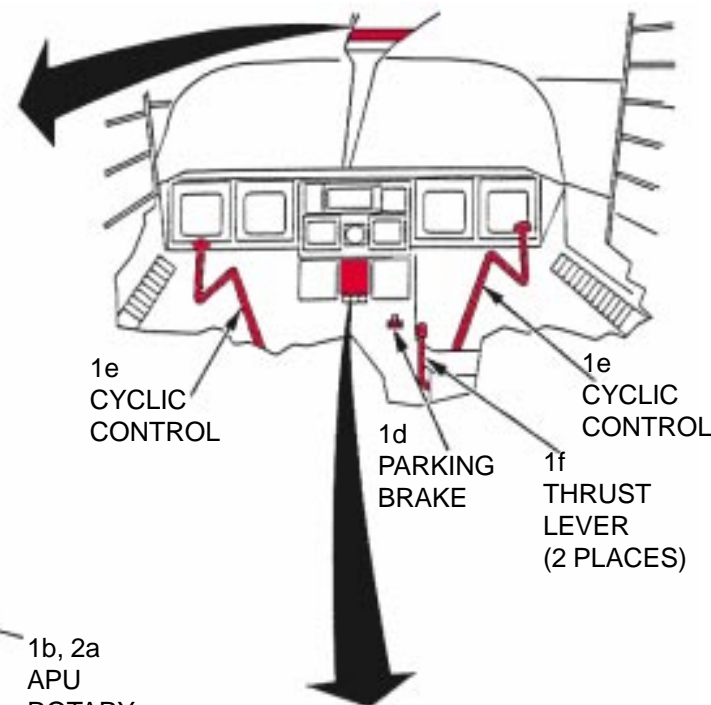
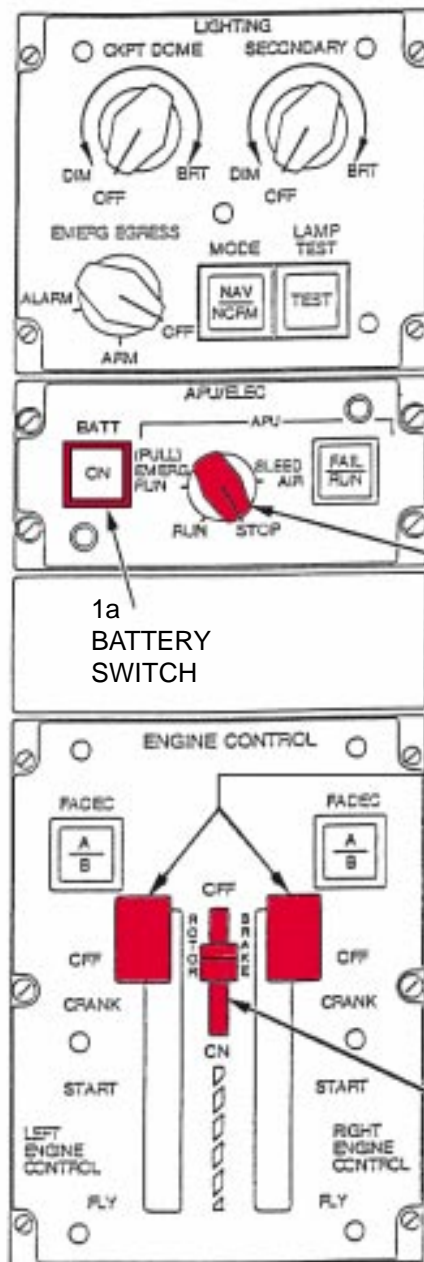
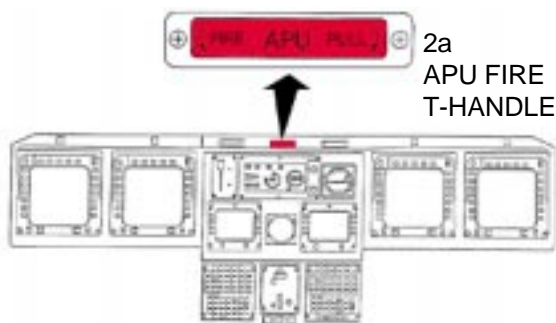
### NOTE:

All engine shutdown components are located on the overhead and center consoles.

- Push battery switch to OFF position.
- Place APU rotary switch in the STOP position.
- Place landing gear control handle in the DOWN position.
- Set the parking brake.
- Place cyclic controls in NEUTRAL position.
- Place thrust lever in the FULL AFT position.
- Place rotor brake handle in the ON position.
- Place engine controls in the OFF position.

## 2. APU SHUTDOWN

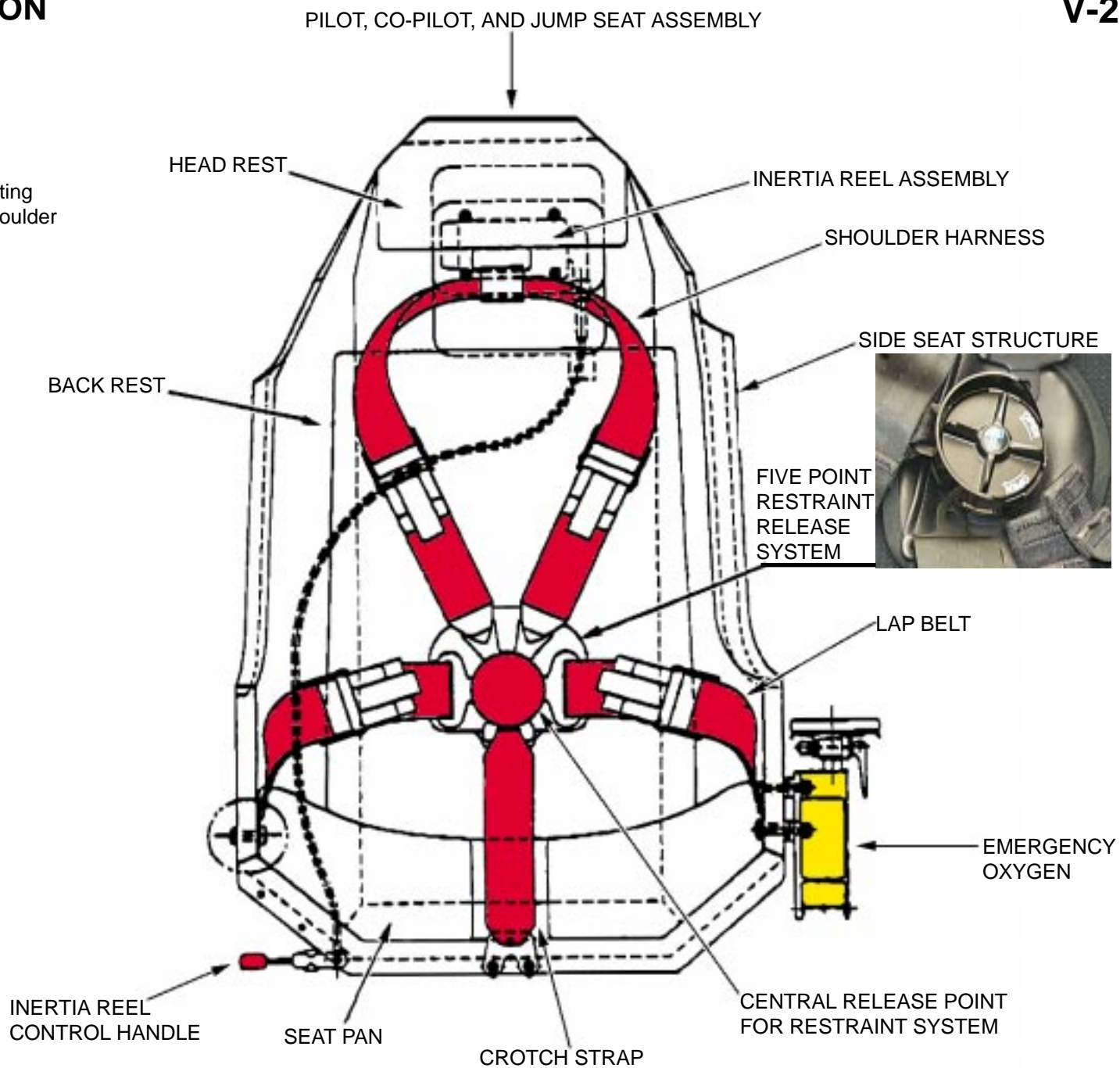
- Shutdown sequence is automatic once APU rotary selector switch is placed in the STOP position.
- Pull the APU fire T-handle, located forward center instrument panel, to shut off fuel flow to the APU. Pulling the handle discharges APU fire extinguisher bottle.



# AIRCREW EXTRACTION

## 1. AIRCREW EXTRACTION

- Disconnect communication lead.
- Disconnect oxygen hose.
- Release restraint system by actuating central release point to release shoulder harness, lap belt and crotch strap.



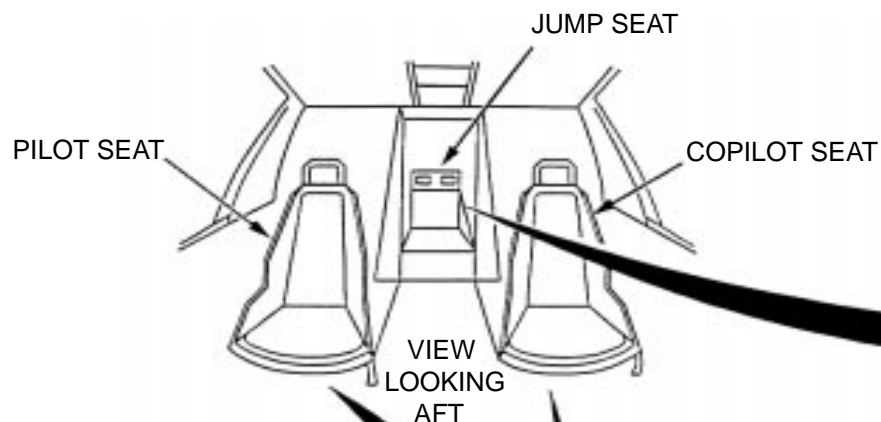
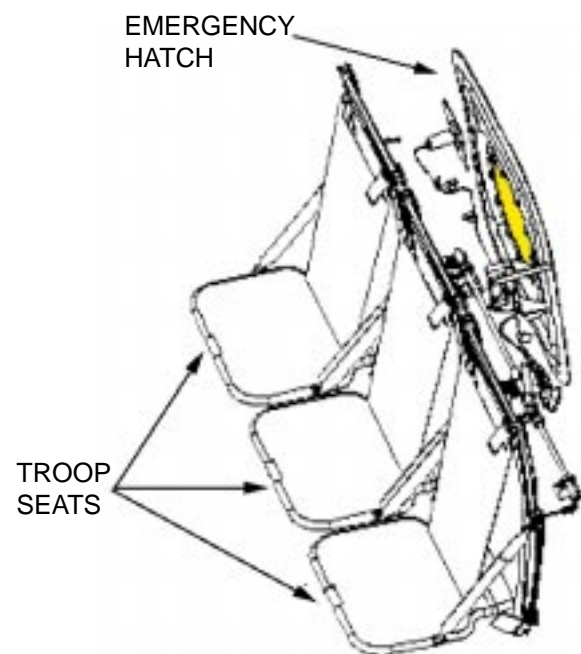
V-22

# AIRCREW EXTRACTION-Continued

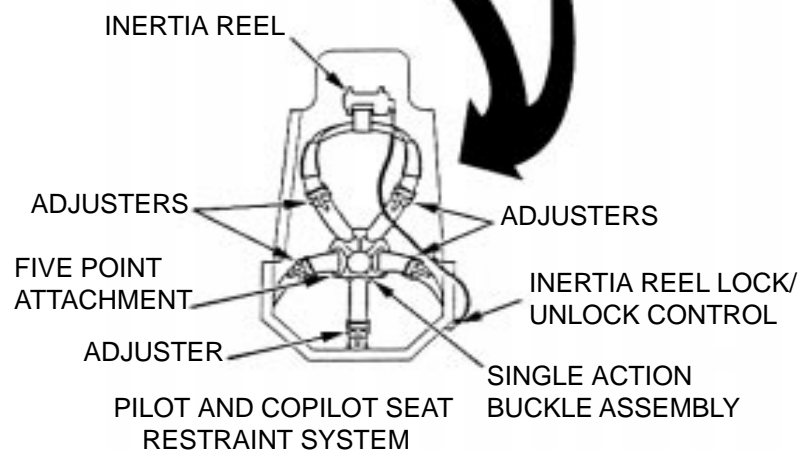
V-22

## 1. AIRCREW EXTRACTION-Continued

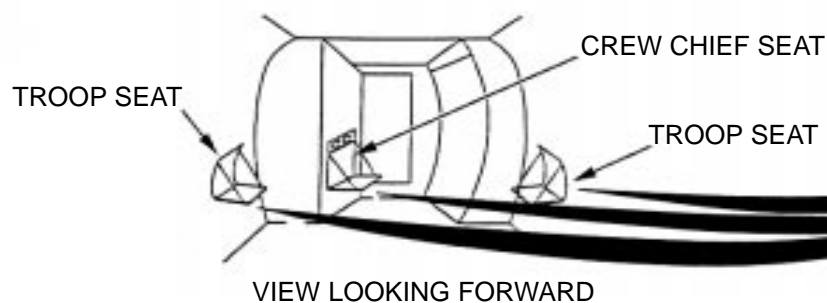
- d. Troop and crew chief seats are equipped with shoulder strap and lap belt, lift the three point release lever.
- e. Jump seats are equipped with the five point release system. Rotate rotary buckle to release occupant.



JUMP SEAT RESTRAINT SYSTEM



PILOT AND COPILOT SEAT RESTRAINT SYSTEM

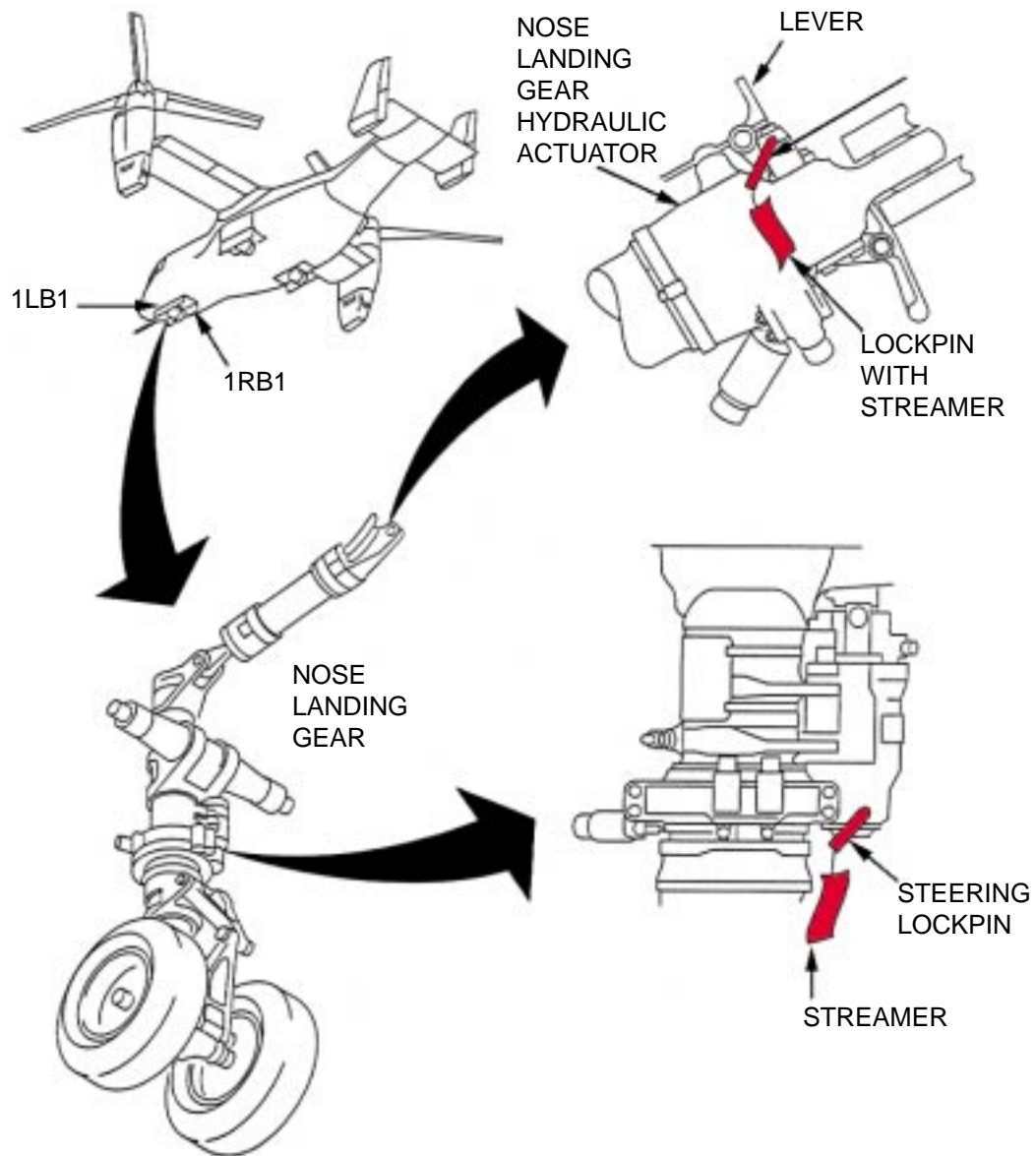


CREW CHIEF AND TROOP SEAT RESTRAINT SYSTEM

# GROUND SAFETY LOCKPINS

## 1. NOSE LANDING GEAR LOCKPINS

- The nose landing gear lockpin assembly allows insertion of the lockpin by ground crew, from the right side of the aircraft nose. Depress handle release mechanism to deploy handle.
- Pull handle to activate ground lockpin.





2. MAIN LANDING GEAR LOCKPINS

- a. Left and right main wheel wells, doors 7LB2 and 7RB2 lockpin holes are on hydraulic actuating pistons.

